

REPORT DOCUMENTATION PAGEForm Approved
OMB No. 074-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing this collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503

1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE 17 May 1964	3. REPORT TYPE AND DATES COVERED Master's Thesis August 1963 - May 1964	
4. TITLE AND SUBTITLE THE EVOLUTION OF DIVISION LEVEL NON-NUCLEAR FIRE SUPPORT COORDINATION OF ORGANIC, ATTACHED, AND SUPPORTING GROUND WEAPONS AND SUPPORTING AIRCRAFT IN THE UNITED STATES INFANTRY DIVISION FROM 1942 TO 1945			5. FUNDING NUMBERS	
6. AUTHOR(S) Tudor, Alfred T., Major, Artillery				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) U.S. Army Command and General Staff College 1 Reynolds Ave. Fort Leavenworth, KS 66027			8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)			10. SPONSORING / MONITORING AGENCY REPORT NUMBER	
11. SUPPLEMENTARY NOTES				
12a. DISTRIBUTION / AVAILABILITY STATEMENT Approved for public release; distribution is unlimited.				12b. DISTRIBUTION CODE A
13. ABSTRACT (Maximum 200 Words) The purpose of this thesis is to trace the evolution of fire support coordination and control at the united States infantry division level through World War II. Coverage is restricted to organic, attached, and supporting ground weapons and supporting aircraft. Troop safety measures are examined briefly in their relationship to fire support control and coordination. The study is based primarily upon division after-action reports and observer reports during periods of active combat from 1942 to 1945.				
<div style="border: 1px solid black; padding: 10px; font-size: 2em; font-weight: bold;">19990726 099</div>				
14. SUBJECT TERMS World War II; Artillery; Fire support; Command and control; Tactical air power				15. NUMBER OF PAGES 117
				16. PRICE CODE
17. SECURITY CLASSIFICATION OF REPORT U	18. SECURITY CLASSIFICATION OF THIS PAGE U	19. SECURITY CLASSIFICATION OF ABSTRACT U	20. LIMITATION OF ABSTRACT U	

NSN 7540-01-280-5500

Standard Form 298 (Rev. 2-89)
Prescribed by ANSI Std. Z39-18
298-102

DTIC QUALITY INSPECTED 4

THE EVOLUTION OF DIVISION LEVEL NON-NUCLEAR FIRE SUPPORT
COORDINATION OF ORGANIC, ATTACHED, AND SUPPORTING
GROUND WEAPONS AND SUPPORTING AIRCRAFT
IN THE UNITED STATES INFANTRY
DIVISION FROM 1942 TO
1945

A thesis presented to the Faculty of the U. S. Army
Command and General Staff College in partial
fulfillment of the requirements of the
degree

MASTER OF MILITARY ART AND SCIENCE

by
ALFRED T. TUDOR, Major, Artillery

Fort Leavenworth, Kansas
1964

THE EVOLUTION OF DIVISION LEVEL NON-NUCLEAR FIRE SUPPORT
COORDINATION OF ORGANIC, ATTACHED, AND SUPPORTING
GROUND WEAPONS AND SUPPORTING AIRCRAFT
IN THE UNITED STATES INFANTRY
DIVISION FROM 1942 TO
1945

An abstract for a thesis presented to the Faculty of
the U.S. Army Command and General Staff College in
partial fulfillment of the requirements of the
degree of

MASTER OF MILITARY ART AND SCIENCE

by

ALFRED T. TUDOR, Major, Artillery

Fort Leavenworth, Kansas
1964

U.S. ARMY COMMAND AND GENERAL STAFF COLLEGE

(Abstract Approval Page)

Name of Candidate Alfred T. Tudor, Major, Artillery

Title of Thesis The Evolution of Division Level Non-Nuclear Fire

Support Coordination of Organic, Attached, and Supporting Ground

Weapons and Supporting Aircraft in the United States Infantry

Division from 1942 to 1945

Approved for Publication by:

Alfred D. Schuch, Research and Thesis Monitor

Robert M. McQuay, Assistant Research and Thesis Monitor

Arthur Z. Hughes Jr., Assistant Research and Thesis Monitor

Date 17 May 1964

The opinions and conclusions expressed herein are those of the individual student author and do not necessarily represent the views of either The United States Army Command and General Staff College or any other governmental agency. References to this study should include the foregoing statement.

ABSTRACT OF THESIS

The purpose of the thesis is to trace the evolution of fire support coordination and control at the United States infantry division level through World War II (1942 to 1945). The coverage is restricted to the coordination and control of organic, attached, and supporting ground weapons and supporting aircraft. Troop safety measures are examined briefly in their relationship to fire support control and coordination. The study is based primarily upon United States infantry division after-action reports and observer reports during periods of active combat from 1942 to 1945.

At the outbreak of World War II the War Department doctrine with respect to fire support coordination and control was clear and workable in some areas and completely lacking in others. Such doctrine as did exist had not been tested in combat. The duties and responsibilities of the division general and special staff in control and coordination of fire support were prescribed in the 19 August 1940 edition of War Department FM 101-5: Staff Officers' Field Manual: The Staff and Combat Orders. The duties and responsibilities of the division artillery commander, who was also the artillery officer on the division special staff, were prescribed in the 10 July 1940 edition of War Department FM 6-20: Field Artillery Field Manual: Tactics and Technique.

Doctrine for the coordination of artillery fires was fairly

complete in 1942. Responsibility for control and coordination of organic, attached, and reinforcing artillery was assigned to the division artillery commander. However, no specific responsibility for insuring the coordination of artillery support with the scheme of maneuver was assigned to either the division artillery commander or the division G-3. In general the doctrinal concept of artillery employment was one of centralized control at division artillery headquarters. Provisions were made for the attachment of artillery units to subordinate elements of the division. However, such attachments were considered exceptions to the normal centralized employment of artillery. The use of artillery liaison officers to supported units and to reinforced artillery units was doctrinal. The exchange of liaison officers among adjacent division artilleries was not considered. The use of artillery groupments to facilitate control and coordination of artillery fires and fire plans existed in concept but lacked specific doctrinal coverage.

The use of air support in ground operations was described in the most general terms in War Department Training Circular 52: Employment of Aviation in Close Support of Ground Troops, dated 29 August 1941. That circular did describe an "Advanced Air Support Command Post," to be set up near the command post of the supported ground unit. Its purpose was to coordinate air operations with the operations of the ground unit. There was a pronounced lack of doctrine in 1942 in the area of the coordination of artillery with air support.

The Allied invasion of Northwest Africa was made in November 1942, subjecting the doctrine for division level coordination of fire support to its first combat test. Except for the retention of centralized control of artillery by the division artillery headquarters when

the need for some attachments to regiments was evident, artillery doctrine proved sound. The employment of air support aircraft, however, needed considerable improvement. The divisions had air support officers attached, but they had little control over the employment of air support. The air support officers acted essentially as advisors to the division commanders. They were forbidden to communicate directly with the support aircraft. Air support missions had to be requested hours, even days, in advance, and the division commander had little flexibility in his use of air support. The bomb line was employed as a troop safety measure in Northwest Africa and apparently was adequate.

During the following year the North African campaign was terminated, Sicily was invaded, landings were made at Salerno, and division-size operations began in the Pacific theater. In general, centralized control of artillery fires was retained by division artillery headquarters in the Mediterranean area. More decentralized operations were normal in the Pacific area. Several divisions began to coordinate the fires of larger caliber non-artillery weapons of the division with the fires of the artillery. A few divisions installed direct telephone lines between the division G-3 and the division artillery S-3, to improve coordination of artillery support with the scheme of maneuver. Artillery was employed in both theaters to mark targets for air strikes with colored smoke. However, that was the extent of air-artillery coordination in 1943. More simplified procedures for requesting air support missions were instituted in the Mediterranean area. The procedures in use in the Pacific area were slow. Division air support officers began communicating directly with the pilots of support aircraft in both theaters in late 1943. However, the primary use to which those commu-

nications were put was to coordinate the artillery marking rounds for target identification. The air support officers did not control air strikes. Day and night bomb lines and panels to mark friendly front lines were employed as troop safety measures in the Mediterranean area. Neither measure was effective in the jungles of the Pacific theater.

The year of change for fire support procedures was 1944. The campaign in Italy was brought to an end, the large-scale invasion of Northern France was launched, and the tempo of action in the Pacific was increased. In Italy and in Northern France the coordination of artillery fires was continuously improved by the more extensive use of artillery liaison officers and subordinate and reinforcing artillery headquarters. Nearly all division artilleries integrated the fires of larger caliber non-artillery weapons of the division into the artillery fire plans. A few division artilleries made some effort to coordinate artillery fires with air attacks, to achieve a greater effect on the target. Air request procedures were further simplified, and, late in the year, some divisions and corps were allocated air support missions in advance of their need. In addition, armed reconnaissance flights were allocated to ground units, giving those units an "on call" air strike capability for the first time. However, only one air support officer was attached to each infantry division in Europe as a rule. Air support in the Pacific area improved also, but not so much as in Europe. Some simplification of air request procedures was accomplished in the Pacific. Air support officers or controllers were attached to regiments and, in some cases, to battalions. Techniques employed in the Pacific area permitted the divisions to employ air strikes on targets of opportunity. Several divisions in Europe encountered serious

troop safety problems in their employment of close air support. However, troop safety did not appear to be a major problem in the Pacific area.

Very few new techniques in fire support coordination evolved during 1945. The use of the more effective techniques of 1944 spread to other divisions. Problems of coordination and troop safety increased appreciably toward the end of the war in Europe. However, those problems were solved by using the techniques of 1944 more extensively.

By the end of World War II the trend toward coordination of air support and the fires of larger caliber non-artillery weapons of the division with the fires of artillery units was becoming evident. The overall trend in the division was for the integration and coordination of all fire support available to the division to be performed at the division artillery headquarters.

THE EVOLUTION OF DIVISION LEVEL NON-NUCLEAR FIRE SUPPORT
COORDINATION OF ORGANIC, ATTACHED, AND SUPPORTING
GROUND WEAPONS AND SUPPORTING AIRCRAFT
IN THE UNITED STATES INFANTRY
DIVISION FROM 1942 TO
1945

A thesis presented to the Faculty of the U.S. Army
Command and General Staff College in partial
fulfillment of the requirements of the
degree of

MASTER OF MILITARY ART AND SCIENCE

by

ALFRED T. TUDOR, Major, Artillery

Fort Leavenworth, Kansas
1964

U.S. ARMY COMMAND AND GENERAL STAFF COLLEGE

(Thesis Approval Page)

Name of Candidate Alfred T. Tudor, Major, Artillery
Title of Thesis The Evolution of Division Level Non-Nuclear Fire
Support Coordination of Organic, Attached, and Supporting Ground Wea-
pons and Supporting Aircraft in the United States Infantry Division
from 1942 to 1945

Approved by:

Alfred D. Schuch, Research and Thesis Monitor
Robert W. McIntire, Assistant Research and Thesis Monitor
Arthur R. Sengler Jr., Assistant Research and Thesis Monitor

Date 17 May 1964

The opinions and conclusions expressed herein are those of the individual student author and do not necessarily represent the views of either The United States Army Command and General Staff College or any other governmental agency. References to this study should include the foregoing statement.

ACKNOWLEDGMENTS

The author acknowledges with deep appreciation the assistance given him in his research by the personnel of the library archives, United States Army Command and General Staff College, Fort Leavenworth, Kansas.

TABLE OF CONTENTS

	Page
ACKNOWLEDGMENTS	ii
INTRODUCTION	1
Chapter	
I	4
II	21
III	28
IV	40
V	70
SUMMARY	92
BIBLIOGRAPHY.	95

INTRODUCTION

It is the purpose of this paper to trace the evolution of fire support coordination and control at the infantry division level through World War II (1942 to 1945). The coverage will be restricted to the coordination and control of organic, attached, and supporting ground weapons and supporting aircraft. Inasmuch as troop safety measures were an aspect of control and coordination of fire support, those measures will also be examined briefly in context.

This study is based primarily upon infantry division after-action reports and observer reports during periods of active combat from 1942 to 1945. These sources were adhered to almost exclusively to avoid the effect of strong individual opinions of the time which might have unduly influenced the course of the study.

The infantry division of World War II was a relatively self-sufficient unit for short periods of time. It possessed a degree of administrative and logistical independence. More important to this paper was its capability to support its maneuver elements by fire. Its infantry companies, battalions, and regiments had their organic supporting weapons. Division Artillery supplied the heavier fires as needed. Additional artillery support was normally available from the corps. Corps artillery units were either attached to the division or their supporting fires were made available upon request by the division for that support. These additional fires were nearly always utilized by the division when they were available.

Corps artillery weapons were normally of larger caliber and

longer range than the weapons organic to the division. Thus, the use of corps supporting fires enabled the division to fire upon a greater variety of targets as well as upon targets at greater ranges.

The effect of massing division artillery fires upon a target was enhanced by the concurrent delivery of additional fires from supporting corps artillery units. In general, the employment of massed fire support enabled the division to accomplish assigned missions with fewer casualties and with greater facility.

The flexibility of artillery support during World War II was such that often other sources of additional artillery fires could be called upon by the division. In a number of cases the division artilleries of adjacent divisions, artillery units of adjacent corps, and artillery units of divisions in reserve lent their fires to a division in need of them.

The division commander of World War II desired to accomplish his mission quickly, efficiently, and surely. He did not overlook the fire support possibilities of the Army Air Corps. The medium bombers, fighter-bombers, and fighters of the Air Corps possessed a number of capabilities which complemented those of artillery units. When properly utilized, tactical aircraft of the Army Air Corps were able to extend the range of influence of the division commander. They attacked and destroyed targets which could not be effectively engaged by artillery. In some cases their support increased the degree of destruction of targets which were engaged by artillery.

During World War II infantry divisions employed various types of fire support. It requires little imagination to picture the chaos which would have resulted on the battlefield if the commander of each fire

support unit had been free to choose and attack his own targets in the manner and at the time he elected. All fire support delivered within the division zone or sector had to be controlled at a sufficiently high level to insure that it would support the division scheme of maneuver without adding to the hazards already faced by friendly troops. Different types of fire support had varying degrees of effectiveness against division targets. Artillery alone employed a large variety of calibers and types of ammunition, each with its own characteristics. Therefore, it was necessary to coordinate and control the various fire support means to realize their fullest potential.

There were many serious problems and difficulties associated with the control and coordination of the fire support available to infantry divisions in combat. At the outbreak of World War II the War Department doctrine with respect to fire support coordination and control was clear and workable in some areas and completely lacking in others. Such doctrine as did exist had not, of course, been tested in combat. However, in some cases allowances had been made for changes in weapons and communications since World War I.

The formulation of new procedures and techniques as well as changes to pre-war doctrine were made and tested in combat. As division level coordination of fire support evolved during World War II, trends were established which led directly to the more effective principles in use today.

CHAPTER I

This chapter will examine War Department doctrine concerning fire support coordination and control as it existed when the United States entered World War II. Particular emphasis will be given to doctrine concerning such coordination at division headquarters and division artillery headquarters.

In the years between World War I and World War II no United States infantry division was employed in combat. The evolution of doctrine concerning division employment and division staff areas of responsibility was exceedingly slow. Some indication of the rate of change in tactical doctrine can be seen in the fact that the 19 August 1940 edition of the War Department FM 101-5: Staff Officers' Field Manual: The Staff and Combat Orders superseded part one, Staff Officers' Field Manual, dated 26 September 1932, issued nearly eight years earlier.¹

Doctrine in the 19 August 1940 edition of FM 101-5 was current at the outbreak of World War II. In prescribing the duties and responsibilities of the division staff sections, in no place does that manual specifically prescribe responsibility for coordinating fire support with maneuver. It does assign to G-3 the responsibility for supervision of combat operations, future planning, and activities concerning the tactical

¹U.S., War Department, FM 101-5: Staff Officers' Field Manual: The Staff and Combat Orders (Washington: U.S. Government Printing Office, 1940), p. 1.

employment of units.²

The Artillery Officer was a designated position on the division special staff. That position was filled by the division artillery commander.³ Responsibilities of the division Artillery Officer included the preparation of plans for the use of field artillery, to include recommendations for its allotment to subordinate elements of the division. Those responsibilities also included the coordination of the fires of subordinate artillery units.⁴ The latter responsibility as prescribed in FM 101-5 referred to the coordination of fires among subordinate artillery units rather than to the coordination of fires with maneuver. The division Artillery Officer was located at the forward echelon of the division headquarters.⁵

Boundaries were used in combat orders in much the same way they are used today. Where possible, they were designated by easily distinguishable terrain features. They served to delimit zones of action or movement and areas of responsibility. Lateral boundaries of a unit extended to the limit of range of the supporting weapons of that unit.⁶

FM 101-5 lists the composition of the special staffs of divisions and higher units, and states that the special staffs may include the listed officers when they were assigned to the unit. Among the officers listed is an air officer. However, an examination of the duties listed for the air officer indicates strongly that he would be assigned

²Ibid., pp. 13-14.

³U.S., War Department, FM 6-20: Field Artillery Field Manual: Tactics and Technique (Washington: U.S. Government Printing Office, 1940), p. 78.

⁴FM 101-5, p. 20.

⁵Ibid., p. 19.

⁶Ibid., pp. 49-50.

only at headquarters higher than division headquarters. The first duty listed for him was the expected one of acting as advisor to the commander and staff on air matters. Some other duties were so worded that they could apply also to division-level activities. However, several of the major duties definitely had no application at division headquarters. For example, the air officer coordinated the utilization of all air units of the command and recommended the allotment of air units to subordinate elements. He determined requirements, procurement, storage, and distribution of aircraft ammunition and technical supplies.⁷

The War Department doctrine for the tactics and techniques of field artillery employment at the outbreak of World War II was contained in the 10 July 1940 edition of FM 6-20: Field Artillery Field Manual: Tactics and Technique. As a further indication of the scarcity of doctrinal changes between World War I and World War II, the 1940 edition of FM 6-20 superseded four parts of volume II, Field Artillery Field Manual, dated 28 December 1931.⁸

The War Department doctrine for the employment of field artillery was based upon the recognition that artillery fire possessed a great power for destruction and neutralization. Its high degree of flexibility was also recognized. Artillery was the division's principal means of attack against material targets. Its fires produced great demoralizing effects on the enemy. Its flexibility allowed artillery to intervene over a zone of great width and depth by rapidly shifting and concentrating its fires to meet the needs of a situation. Without changing its positions, artillery could concentrate large masses of fire power

⁷Ibid., pp. 18-20.

⁸FM 6-20, p. 1.

against critical objectives in the combat zone. The fires of field artillery so massed under a common fire direction could be maneuvered by the division commander, through the division artillery commander, to powerfully influence the course of combat.⁹

The principle of massing artillery fires for greater effectiveness and greater influence on the course of combat (centralized control) was generally accepted. It followed that the efficiency of maneuvering massed artillery fires was directly dependent upon adequate control, close liaison with supported troops, and efficient communication and observation.¹⁰ Thus, much of the contents of FM 6-20 were concerned with techniques for insuring proper control, coordination, and responsiveness among artillery units.

As pointed out earlier, FM 101-5 designated the division artillery commander as the Artillery Officer of the division special staff. He was assigned the responsibility of coordinating the artillery fires of the division. FM 6-20 went a bit further in describing the responsibilities of the division artillery commander. To those duties listed in FM 101-5 was added that of preparation of plans for cooperation of the division artillery with tanks and with Air Corps units assigned attack or bombardment missions within the division area. Also added was the duty of supervising observation, signal communications, and liaison within the division artillery.¹¹

The artillery command post was to be located as near as practicable to the division command post. The purpose of this requirement was to permit the division artillery commander to properly fill his two roles

⁹Ibid., pp. 69-70.

¹⁰Ibid., p. 70.

¹¹Ibid., p. 78.

as commander of artillery in the division and as Artillery Officer on the division special staff.¹² The division commander exercised control of division artillery through the division artillery commander, who in turn exercised his tactical control of the artillery units through his nearby command post. This control was accomplished primarily through the fire direction center established and operated by the division artillery S-3. It must be understood, however, that the division artillery fire direction center did not compute firing data for normal support fire missions. Neither did it perform the other technical duties of battalion fire direction centers. It was a tactical fire direction center whose main function was to exercise control and perform fire coordination on the division level. It did assign targets to battalions under conditions where division-level coordination was necessary. An example of this situation would be one in which the division artillery found it necessary to operate a counterbattery system, normally a function of the corps artillery headquarters.¹³

It is interesting to note that in no place does the 1940 edition of FM 6-20 refer to a countermortar system or program. Later, of course, countermortar activities became a matter of deep interest to division artillery, and their implementation became a major function of division artillery.

Another important function of the division artillery S-3 and his fire direction center was to assist the division artillery commander in the preparation of the artillery subparagraph and the artillery annex of the division combat order.¹⁴ It was through these elements of the

¹²Ibid., p. 114.

¹³Ibid., pp. 89-92.

¹⁴Ibid., pp. 89-90.

division combat order and through standing operating procedures of division artillery that the commander of division artillery accomplished much of his permanent and semi-permanent control and coordination of the fires of subordinate units.

In his organization for combat, the division artillery commander found fairly complete War Department doctrine to guide him. As discussed earlier, the concept of centralized control of artillery to facilitate massing of its fires was doctrinal. FM 6-20 reinforced this concept by pointing out that the attaching of division artillery units to infantry units of the division greatly reduced the ability of the artillery to deliver concentrated fire. Lacking centralized control and the ability to concentrate artillery fire, the division commander would be less able to influence the progress of the action as a whole. Consequently, normal employment of artillery units was in a supporting role rather than attached. The light artillery units were normally assigned the mission of "direct support", with one artillery battalion usually supporting one infantry regiment. The organic and attached medium artillery units of the division were normally given a mission of "general support" of the division as a whole. Since the general support artillery fired in support of the entire division, the division artillery commander was able to mass these fires more quickly than those of direct support battalions. The direct support artillery battalion was primarily interested in furnishing fires required by its supported unit. It fired in general support of the division only in filling a secondary mission. Its fires, therefore, could also be concentrated by division artillery with reasonable facility. However, the assignment of a support mission in no way subordinated the artillery unit to the commander of the supported

unit. Therefore, when required, the division artillery commander was able to concentrate the fires of his units regardless of the support mission assigned.¹⁵

It should be noted that allowance was made in War Department doctrine for those times when combat broke into disconnected local engagements or when the division could not be employed as a whole in coordinated action. Under those conditions the division commander could attach any, or even all, of division artillery to his infantry units. In fact, FM 6-20 states that when undependable liaison and communications between the infantry units and supporting artillery was foreseen, batteries, platoons, or even individual artillery pieces could be attached to smaller infantry elements.¹⁶

Another means by which artillery units were controlled was their assigned zones of fire. That term referred to the zone in which a particular artillery unit was to be prepared to deliver fire. The "normal" zone of fire was that zone in which the unit ordinarily delivered its fire. Areas within the division zone of action other than the "normal" zone of fire of a particular artillery unit could be assigned to that unit as "contingent" zones. Such an assignment meant that the unit could expect to be called upon to fire into those areas in certain contingencies. The normal zone of fire for a direct support artillery unit coincided with the zone of action or sector of its supported infantry unit. The normal zone of fire for a general support artillery unit ordinarily coincided with the zone of action or sector of the whole division. The division artillery commander exercised a

¹⁵Ibid., pp. 71-72.

¹⁶Ibid., pp. 72-73.

degree of control over the fires of his units in the assignment of normal and contingent zones of fire.¹⁷

Since the normal zone of fire for corps and army artillery units coincided with the zone of action or sector of the corps and army respectively, some coordination was necessary between the division artillery and the artillery of the higher echelons. Artillery doctrine recognized that normally corps and army artillery units were equipped with longer range weapons than the division artillery. Therefore, provisions for dividing the zone of fire in depth were contained in doctrine. A line (usually designated "XX") was drawn parallel to the front line and within the enemy position. Division artillery had responsibility for all fire missions short of the "XX" line. When army artillery was involved, a "ZZ" line was drawn deeper in enemy-held territory. The corps artillery was given responsibility for missions between the "XX" and "ZZ" lines, with army artillery assuming responsibility for fires beyond the "ZZ" line. (The "YY" line was used by the corps artillery to further divide its zone in depth when it chose to divide responsibility for fires between long-range and other artillery units.)¹⁸

No specific depths were given for the "XX" and "ZZ" lines. It is reasonable to assume that those depths were variable. They would have had to depend upon the type of operation undertaken, the ranges and other capabilities of the weapons possessed by the units at the different echelons, and the observation and communication capabilities of the division, corps, and army artilleries.

The "no fire line" familiar to the direct support artilleryman

¹⁷Ibid., pp. 111-112.

¹⁸Ibid., p. 112.

of World War II was not prescribed in the 1940 edition of FM 6-20. That line was drawn by the commander of the direct support artillery unit, parallel to the front line of the supported unit, and relatively close in. No other artillery unit was allowed to fire short of the no fire line without clearance from the direct support artillery commander who placed it there. The primary purpose of the no fire line was to improve troop safety in the front lines.

The "XX" and "ZZ" lines were control and coordination measures and were used for basic coordination among artillery of different echelons. However, it was normal for artillery units at one echelon to be assigned the mission of reinforcing (augmenting) the fires of artillery units of another echelon. While it was more usual for corps artillery units of longer range and heavier calibers to reinforce division artillery units, it was not unusual to expect division artillery units to fire in zone in support of corps artillery missions. Such missions might be preparations, harassing and interdiction programs, and counterbattery missions. And here the field artillery liaison officer proved his value. He was the person charged with completing artillery coordination on the spot, when and where needed. It was doctrine that any artillery unit assigned a reinforcing mission established liaison with the reinforced artillery unit, primarily to effect close coordination of fires. In addition it was normal for corps artillery units in general support to establish liaison if needed with those units of division artillery which had normal zones within those of the corps units concerned. After coordination had been effected and clearance secured, it was perfectly normal for one unit to fire into the zone of another unit.¹⁹

¹⁹Ibid., p. 114.

The artillery liaison officer was probably the greatest single aid to the division artillery commander in his efforts to control and coordinate both the artillery fire delivered by division units and that delivered within the division zone or sector by units not organic to the division. Liaison was established and maintained by the supporting unit at all times during active operations. The division light artillery battalion in direct support of a regiment (normal employment) maintained liaison officers and their sections, which included communication equipment, at all supported infantry battalions. The liaison officer's position was usually at the infantry battalion command post. In addition, the direct support artillery battalion maintained its own command post near that of the supported regiment if it was feasible to do so. This was done so that the preferred method of liaison by personal contact between the commanders could be utilized. If such an arrangement was not feasible, the direct support battalion maintained a liaison officer and section at the supported regimental command post.²⁰

The close liaison necessary between division artillery and the division command post was performed essentially by the division artillery commander in his other role as the artillery officer on the division staff. To facilitate the close liaison, the division artillery command post was to be located as near to the division command post as was practicable.²¹

Artillery units whose missions were to reinforce the fires of direct support artillery were required to establish liaison at the command posts of the supported artillery units. This requirement applied

²⁰ Ibid.

²¹ Ibid.

to both organic and attached artillery units. It applied also to corps artillery units that fired into areas covered by division artillery units. Although not specifically stated, this requirement for liaison from supporting to supported artillery could logically be applied to a division artillery supporting another division artillery. This indeed was the case in actual practice during World War II. The liaison sections used in these instances were small, usually consisting of one officer and one or two men.²²

Liaison between adjacent units (divisions) in combat was to be established when it appeared desirable.²³ However the 1940 edition of FM 6-20 made no reference to the establishment of liaison between adjacent division artilleries. Therefore, it must be assumed that such liaison between adjacent division artilleries was not part of the field artillery doctrine of 1940 and 1941.

The artillery liaison officer had a number of duties, most of which were directed toward more efficient utilization of the fire power of his unit and better integration of the fires of the force as a whole. At all levels he was an important instrument in the integration and coordination of artillery fire plans. The overall responsibility for artillery fire plans rested with the division artillery commander. The artillery fire plan represented the best efforts of the infantry and artillery commanders (and artillery liaison officers) at all levels to provide powerful, deep, and continuous fire support to the division and its front-line elements. Power was obtained by planning for the concentration of the mass of fire at the decisive point at the critical time.

²²Ibid.

²³FM 101-5, p. 32.

The depth and continuity of fire were achieved by the location and displacement of artillery units to take advantage of the different ranges and capabilities of their weapons. Continuity of fire was improved by integrating the fires of the supporting weapons of the infantry with those of organic and supporting artillery.²⁴

Artillery fire plans of many different types were needed to support the operations of the infantry division. There were offensive and defensive plans, preparation and counterpreparation plans, fire plans to support counterattacks, and many others. However, they all had one major characteristic in common. That was the coordination of all infantry supporting weapons and artillery available to the planners. The coordination was perfected to the maximum extent permitted by time and circumstances.

The basic purpose of coordinating fires was to support the operation as effectively and efficiently as possible, and to insure safety to the supported maneuver force.

The preparation of the coordinated fire plan started at the supported infantry unit and was directed toward producing the best fire support practicable for the scheme of maneuver. The initial preparation was done by the supported commander (operations officer) and the supporting artillery commander (liaison officer) working together. Between them they knew the capabilities of the infantry and artillery weapons available to them. They could coordinate the employment of their respective weapons for most effective support of the operation. The partial fire plan was then integrated into the coordinated fire plan similarly produced at the next higher supported and supporting level. The final

²⁴FM 6-20, p. 119.

integration and coordination of the overall division fire plan was the responsibility of the division artillery commander. He was also responsible for the proper coordination and integration of the fires of reinforcing artillery into the division plan.²⁵

Although no specific responsibilities for such coordination were prescribed, it was recognized that coordination of fires should be effected across the entire front, laterally as well as in depth. This concept probably played a part in initiating the later practice of exchanging liaison officers between adjacent division artilleries.²⁶

Another aspect of control and coordination of artillery fire lay in the positioning and displacement of artillery units. By his retention of centralized control the division artillery commander could position his units to place the mass of fire where he felt it was most needed. The displacement of artillery was carefully coordinated so that the bulk of the artillery was always in firing positions. The technique of artillery displacement by echelon was normally used. The positioning and displacement of direct support artillery units was normally decentralized to the commanders of those units. The division artillery commander coordinated the moves of direct support artillery as needed.²⁷

The radio communications, survey information and facilities, and air observation available to an artillery unit determined in part the amount and effectiveness of its fires. The division artillery commander could control and coordinate the fires of his units partly through his allocation and coordination of those items. In his recommended allocation of ammunition to artillery battalions, the division

²⁵Ibid., pp. 119-120.

²⁶Ibid., p. 141.

²⁷Ibid., pp. 115-116, 120.

artillery commander controlled the fires of his units more directly.²⁸

Often a division artillery was increased by the addition of attached units of artillery. When this happened, temporary artillery organizations were formed. Each temporary organization consisted of several divisional or attached units under a single command. Depending upon their sizes, these temporary units were called "groupments" or subgroupments."

The headquarters of groupments were employed as intermediate tactical headquarters between firing battalions and division artillery headquarters. This arrangement in no way lessened the responsibility and capability of the latter headquarters to control and coordinate the fires of organic and attached artillery of the division. Instead their use as intermediate tactical headquarters led to better and more responsive control in cases where the division had more organic and attached artillery than was normal. Division artillery span of control problems and problems relating to the maintenance of reliable communications between division artillery headquarters and its units were all reduced. Control and coordination were accomplished by division artillery headquarters through the headquarters of the groupments.²⁹

There was no concrete War Department doctrine for the employment of air power in support of ground operations until the latter half of 1941. Certainly many officers of our ground forces and Army Air Corps saw rich possibilities in such support. They must have been impressed in 1939 and 1940 by the use of German air power to support operations of the German army.

War Department Training Circular 52, issued 29 August 1941, con-

²⁸Ibid., pp. 112-113.

²⁹Ibid., p. 53.

tains the doctrine concerning air support of ground forces with which we entered World War II. That circular recognized the extreme flexibility of air support as a result of its long range, high speed, varying ordnance, observation capabilities, and communications. The circular stated that because of this very high degree of flexibility and responsiveness the use of air power must be very carefully coordinated with ground operations. The responsibility for that coordination was given to the supported ground force commander.³⁰

The Advanced Air Support Command Post (AASCP) was to be set up at or very near the command post of the supported ground force. Its primary purpose was to coordinate air operations with the supported ground unit. The supporting air commander and the ground force commander ideally should both be present in the AASCP. In their absences they were to be represented by officers who had the authority to make decisions for them. Subordinate units of the supported ground force were to communicate directly with the AASCP in requesting air support. The requests were evaluated at the AASCP and if approved were sent directly to the air supporting units for execution.³¹ The AASCP was to be located at corps and army levels; not at the division headquarters.

As a coordination measure the bomb safety line was established. It was defined as "a line selected on the ground to assure reasonable security to friendly troops from the effects of bombs dropped by supporting aviation."³² The responsibility for the establishment of the bomb safety line was not specified, but the AASCP was charged with keep-

³⁰U.S., War Department, Training Circular 52: Employment of Aviation in Close Support of Ground Troops, (1941), p. 4.

³¹Ibid., pp. 1-8.

³²Ibid., p. 1.

ing air units abreast of the ground situation.³³

As mentioned earlier, the 1940 edition of FM 6-20 assigned to the division artillery commander the responsibility for "cooperation" (practically synonymous with "coordination" as used today) of division artillery with Air Corps units attacking or bombing within the division sector or zone. Yet neither he nor his representative had any liaison connections with the AASCP. There were no effective provisions for coordination of the fire support delivered by aircraft with that of organic and supporting artillery.

There were several major shortcomings in fire support coordination doctrine at the end of 1941. There were no provisions for coordinating artillery and air support together in support of division operations. Although the division commander was given responsibility for coordinating the use of air power with ground operations, he had no effective means to achieve that coordination. The division was unable to communicate directly with support aircraft. Provisions had been made for the employment of a bomb safety line as a feature of troop safety.

There were provisions in doctrine for the coordination of infantry supporting fires with artillery fires. The concept of centralized control of artillery was firmly established. The division artillery commander employed a number of techniques to coordinate and control artillery fires. The use of artillery liaison officers was standard, but did not include the exchange of liaison officers between adjacent division artilleries. The no fire line of direct support artillery units was not used.

At the end of 1941 most of the doctrine concerning fire support

³³Ibid., p. 8.

coordination was related to artillery control. There were major omissions in doctrine concerning division employment of air support.

CHAPTER II

This chapter will examine the fire support coordination procedures and techniques utilized by the infantry division in 1942. Since most of the division-level combat in that year was performed by the 1st Infantry Division in North Africa, this chapter will be focused on that division. Also considered will be the only official change to War Department doctrine in fire support coordination during 1942.

The War Department doctrine relating to responsibilities and duties in the coordination and control of fires within a division remained unchanged from August 1940 to May 1942. In that month an anti-tank officer was authorized on the special staff of the division.¹ This position was intended to be filled by the commanding officer of the attached tank destroyer battalion. Such battalions were normally attached to divisions.

The duties of the antitank officer on the special staff included the function of acting as an advisor to the commander on the employment of tank destroyer units. He also advised on the use of other antitank measures and prepared plans for the employment of tank destroyer units. Additionally, he was given the duty of coordinating the tactical employment of all tank destroyer units with the command as well as the duty of

¹U.S., War Department, FM 101-5: Staff Officers' Field Manual: The Staff and Combat Orders, Changes No. 2 (Washington: U.S. Government Printing Office, 1942), p.1.

establishing liaison between tank destroyer and other units.²

In collaboration with the division artillery commander and the antiaircraft artillery officer of the division special staff, the anti-tank officer prepared plans for the employment of both light artillery and antiaircraft artillery on antitank missions. He also coordinated requests from subordinate units for antitank missions to be performed by support aircraft.³

No one in the division was specifically charged with the coordination of antiaircraft artillery fires on terrestrial targets unless the antiaircraft artillery unit was considered as part of division artillery when so employed. In that case, of course, the coordination responsibilities would belong to the division artillery commander. Plans for such fires in the antitank role, as noted above, were made by the division antitank officer in "collaboration" with the antiaircraft artillery officer. The antitank plan itself was the major technique of coordination.

It must be realized that antiaircraft artillery units and anti-tank (tank destroyer) units were not organic to the infantry division of 1942. They were to be attached to the division as they were available and required.

The various techniques and War Department doctrine concerning the coordination of fire support by the infantry division had no combat test until late in 1942. During 1942 a number of American divisions arrived in overseas theaters, and one - the Americal Division - was acti-

²Ibid.

³Ibid., p. 2.

vated in New Caledonia.⁴ In September and October elements of the 32d Infantry Division and the Americal Division were committed in action on New Guinea and in the Solomon Islands respectively. However, the division headquarters and other elements of the divisions did not see action until some time later.⁵

The first American infantry division to see action as a division was the 1st Infantry Division near Oran, Algeria. Operation TORCH, the Allied invasion of Northwest Africa, commenced with landings on 8 November 1942. The first landings were made near Algiers at 0100 hours by the Eastern Assault Force. The Force contained Regimental Combat Team 39 (RCT 39) of the 9th Infantry Division, RCT 168 of the 34th Infantry Division, and a number of British units. At 0130 hours the Center Assault Force began its landings near Oran. The Center Force was composed of the 1st Infantry Division, 1st Ranger Battalion, and Combat Command "B" of the 1st Armored Division. At about 0500 hours the Western Assault Force began landing elements at rather widely separated points in Morocco. The Western Force was composed of the 3rd Infantry Division, units of the 9th Infantry Division, and units of the 2d Armored Division.⁶

The Center Assault Force under Major General Lloyd Fredendall landed RCT 26 about thirteen miles west of Oran. Its mission was to seize the coastal town of Les Andalouses and proceed east to Oran. The 1st Infantry Division, less RCT 26, landed some twenty miles to the east of Oran, to seize Arzen and proceed to Oran from the east. The major

⁴U.S., Department of the Army, Office of the Chief of Military History, United States Army in World War II: Special Studies: Chronology 1941-1945 (Washington: U.S. Government Printing Office, 1960), pp. 32, 38, 39.

⁵Ibid., pp. 55, 59.

⁶Ibid., pp. 64-65.

elements of the 1st Infantry Division (-) were organized into two regimental combat teams, RCT 16 and RCT 18. The ranger battalion of the Center Assault Force also landed at Arzen. A task force from Combat Command "B", 1st Armored Division, landed west of Les Andalouses, opposite Lourmel. Its mission was to secure the airfield at Lourmel. The remainder of Combat Command "B" landed near Arzen with the mission of capturing the airfield at Tafaraqui. The purpose of the early capture of these two airfields was to secure ground bases for the operations of the 31st Fighter Group aircraft. That unit would thereafter support the 1st Division in the Oran area. (The initial air support for the 1st Division's operations was supplied by carrier-based aircraft.) Both airfields were captured by 1200 hours on 8 November.⁷

Artillery employment by the 1st Division left something to be desired. One battalion of antiaircraft artillery (automatic weapons) was attached to the 1st Division for the operation. It was further attached by batteries to the regimental combat teams, greatly simplifying the coordination required for the landings. However, in spite of the fact that the landings were as much as thirty-five miles apart, the light artillery units were not attached to the regiments. They were assigned direct support missions, and, in theory at least, division artillery headquarters retained centralized control of the light battalions.⁸ This failure to attach the light artillery battalion to RCT 26, some thirty-five miles from the remainder of the division, served

⁷Col. Vincent J. Esposito (ed.), The West Point Atlas of American Wars (New York: Frederick A. Praeger, 1959), II, sec. 2, map 82.

⁸U.S., War Department, 1st Infantry Division, "Field Order No. 1" (10 October 1942), p. 1.

no useful purpose. It was a violation of artillery doctrine. The 1940 edition of FM 6-20 stated, "When circumstances are such that the superior commander cannot efficiently direct the fire of the supporting artillery, it should be attached to the supported unit."⁹

The 2d U.S. Corps was the controlling headquarters for the operations in the Oran area. Initially the 2d Corps Command Post (CP) was afloat and air support was furnished to the ground force by carrier-based aircraft. Division units were directed to forward their requests for air support to the division CP which in turn forwarded them to the Corps CP afloat. The Corps CP then arranged for carrier-based aircraft to fly the missions.¹⁰

It was expected that the airfields mentioned earlier would be secured by D plus 3. At that time planes of the Royal Air Force and the U.S. Army Air Corps (12th Air Force) would be flown in from Gibraltar to the captured fields.¹¹ When this was accomplished and the Corps CP had been established ashore, the Air Support Control radio net was opened. This net afforded direct radio communications between the air support control party at the corps CP and the 12th Air Force headquarters. It was used to forward air support requests from the 1st Division. In addition to furnishing the air support control party at the corps CP, the 12th Air Force also furnished a detachment of one officer and seven enlisted men as an air support party at the 1st Division CP. Because of

⁹U.S., War Department, FM 6-20: Field Artillery Field Manual: Tactics and Technique (Washington: U.S. Government Printing Office, 1940), p. 72.

¹⁰1st Division, "Field Order No. 1," p. 3.

¹¹Esposito (ed.), II, sec. 2, map 82.

the distance involved an identical air support party was furnished to RCT 26. Requests for air support were forwarded by subordinate units to the CP's of the 1st Division and RCT 26 respectively. There they were processed and forwarded, if approved, to the air support control element at the corps CP.¹²

There is no indication that the air support parties at the division and RCT CP's did any more than advise on the use of air support, screen and process air requests from subordinate units, and forward approved requests to the air support control party at the corps CP. Such things as directing the mission aircraft on to targets through direct radio communications with the pilots and utilizing aircraft already airborne to strike targets of opportunity located by ground elements were techniques of the future in 1942.

The 1st Infantry Division plan for Operation TORCH made provisions for the identification of friendly ground elements by Allied aircraft. The plan provided for the display of a white panel by the ground units. However, this display would be shown only on order of a platoon or higher commander, since "...the enemy is likely to imitate our signals."¹³

Although tested to some extent, the fire coordination measures employed by the 1st Division in Operation TORCH were not really tested fully as they would have been in an operation under sustained combat conditions. On 11 November all resistance of French forces in Northwest Africa ceased, and the 1st Division entered Oran without fighting.¹⁴

¹²1st Division, "Field Order No. 1," annex 5.

¹³Ibid., annex 10.

¹⁴U.S. Army: Chronology, p. 66.

Fire support coordination doctrine had no combat test at division level until American forces participated in the Allied invasion of Northwest Africa in November 1942. Initial air support for the landings was furnished by carrier-based aircraft. After airfields were captured, ground-based aircraft could be employed for support. An air support officer was attached to the division headquarters. A second air support officer was with RCT 26 of the 1st Infantry Division. The RCT was some distance from the division. Air requests from the division and the RCT were forwarded to the 2d Corps CP, which forwarded them to the air support unit. The 1st Division had no control over the air strikes in support of the division.

Identification panels were used by division units to mark their front lines for safety purposes. The display of panels could be authorized only by an officer.

Centralized control of artillery was retained by the 1st Division Artillery headquarters, in spite of the fact that some artillery battalions were separated by up to thirty-five miles. The retention of centralized control under those circumstances was a violation of artillery doctrine.

The planned employment of tank destroyer battalions in 1942 was to attach them to divisions. When such a unit was attached to a division, doctrine provided for its commander to function as the anti-tank officer on the division special staff. He coordinated the use of artillery, antiaircraft artillery, and air support on antitank missions.

CHAPTER III

Many U.S. infantry divisions were engaged in combat in 1943 as compared to the number in 1942. As a result fire support coordination doctrine was subjected to considerably more testing in 1943.

This chapter will examine selected experiences of divisions in the Mediterranean and South Pacific areas during 1943. The examination will focus on division fire support control and coordination problems and on procedures and techniques employed by the divisions to accomplish coordination of fire support.

Starting in mid-November of 1942, General Eisenhower began transferring American units from the quiet Oran-Algiers area to General Anderson's 1st Army, which was making a drive on Tunisia. The 2d U.S. Corps, under Major General Fredendall, began arriving in the Sbeitla area in early January 1943. Air support for the elements of 2d Corps was furnished from fields located up to one hundred miles in rear of the front lines.¹

From the beginning of the year to 13 May 1943, when the last major Axis force in Africa surrendered to the British 8th Army near Tunis, the 2d U.S. Corps saw considerable action. Among its major elements were the 1st, 9th, and 34th U.S. Infantry Divisions and the 1st U.S. Armored Division. During this same period the 2d Corps had three

¹Col. Vincent J. Esposito (ed.), The West Point Atlas of American Wars (New York: Frederick A. Praeger, 1959), II, sec. 2, map 84.

commanders in succession: Generals Fredendall, Patton, and Bradley.²

During and at the end of the North African campaign, Colonel Henry V. Dexter, G-3 of the 2d U.S. Armored Corps, visited the theater. In his capacity as an observer for Headquarters, Army Ground Forces, he conducted a series of interviews with commanders and key staff officers in the units of the 2d U.S. Corps. Most of his interviews were with officers of the 1st, 9th, and 34th Infantry Divisions. He interviewed officers of units as small as battalions. The interviews were concerned primarily with air support of ground operations.³

The divisions established bomb lines from three to five miles in advance of their front-line elements. These bomb lines were effective during daylight hours. Night bomb lines were established at distances of five to ten miles beyond the day bomb lines. Considerable care was taken to choose the bomb line along prominent natural features to aid in pilot location of the line. Occasionally some coordination was necessary by 2d Corps headquarters to reconcile the bomb line where it crossed division boundaries. Aircraft were free to bomb at will beyond the bomb line, but could operate short of the bomb line only upon specific request of the ground commander. When making such a request, the ground commander was required to furnish a description of the target. The bomb lines (day and night) were kept posted on all air and ground operations maps and were continually revised. The responsibility for promptly and accurately reporting changes to the bomb lines fell upon the ground commanders. Most commanders interviewed thought the bomb

²Ibid., maps 84-88.

³U.S., War Department, Army Ground Forces, "Report of Visit to the North Africa Theater of Operations" (11 June 1943).

line technique worked well in general. However its primary purpose appeared to be troop safety rather than coordination of fire support efforts.⁴

The 12th Air Support Command furnished air support to the 2d Corps. That support included one air support party attached to the Corps headquarters and one party to each of the divisions of the corps. The air requests of the divisions were sent directly to the 12th Air Support Command by the division air support parties without going through the Corps headquarters. The air support party at Corps headquarters was only used to forward requests originating in the Corps headquarters.⁵

Thus, channels had been established for divisions to request air support and air support parties were present with the divisions to advise upon and forward those requests. However, Colonel Dexter found that there was not one single instance on the Tunisian front in which any air unit (or specific missions) had been allocated to a ground commander and over which he had demand authority. He found that direct air support missions of ground troops were rare. More than ninety percent of the total tactical air missions flown were in pursuance of the air plan and originated in the air headquarters. Less than ten percent of the missions flown were in response to ground commanders' requests. At division level there was no coordination between the ground plan and the air plan except that inherent in the use of the bomb line.⁶

In no instance was an air mission in flight diverted to fill a ground request although several such requests were made. One limiting factor on ground use of air support was the policy in effect initially

⁴Ibid., p. 5.

⁵Ibid., p. 4.

⁶Ibid., p. 1.

at the air support headquarters. That policy specified that no missions would be flown within artillery range. Since ground observers could seldom see beyond artillery range, there were very few ground requests accepted by the air support headquarters.⁷

In the early part of the campaign direct communication between the mission aircraft and the ground combat units was prohibited by Headquarters, Northwest Africa Tactical Air Force.⁸ Later in the campaign the air support party at the division CP was able to talk directly to the mission aircraft. Also the air policy of not flying missions within artillery range was relaxed somewhat. The primary use of direct communications between the pilot of the aircraft and the air support officer was to coordinate the marking of the target with artillery smoke and to refine the target description given in the request. A variety of colors and patterns were fired by artillery to identify targets for the support aircraft. If pilots were still uncertain of specific targets, the direct communications between them and the division air support officer allowed additional identification instructions to be transmitted. It should be remembered that both the air support party and the division artillery CP were located in the vicinity of the division CP. Therefore, the arrangements for artillery marking rounds "on call" were simple and routine. The effects of air attacks requested by the divisions improved considerably when direct communication with the mission aircraft was authorized.⁹

In spite of the use of bomb lines there were a few cases of friendly aircraft attacking our own troops. During the Oran operation

⁷Ibid., p. 6.

⁸Ibid., p. 2.

⁹Ibid., pp. 22-23, 25.

the 1st Infantry Division had enjoyed some success in identifying their units by white panels. In 1943 the required procedure for identification was to display a new-type cerise panel. However the commanders in the 1st, 9th, and 34th Divisions all said that they never had the new panels during the campaign. Many of the lower commanders stated that they preferred the risk of an occasional attack by Allied planes to the greater risk incurred by marking the locations of their units for enemy aircraft and artillery.¹⁰

Other than the use of division artillery units to mark air targets on schedule or upon request of the division air support officer there was no change in the doctrine and techniques of field artillery employment during the North African campaign. The changes which had been made in the ground use of air support appear to have been focused more on improved troop safety and better designation of the target for air attack than on coordinated employment of air support and artillery in their complementary roles. At least personnel of the division air support party and the division artillery headquarters were talking to each other about marking air targets with artillery, if about no other aspect of coordination.

With Tunisia secured the Allies launched Operation HUSKY with the invasion of Sicily on 10 July 1943. Most of the forces for that operation came from the Allied forces in North Africa. Except for an increased use of naval gunfire the employment of fire support on the division level was essentially identical with that of the earlier operations in North Africa. As in the earlier landings, a major objective

¹⁰Ibid., pp. 20-21.

was the early capture of airfields to be used for close air support bases.¹¹

The decision had been made that Operation OVERLORD, the invasion of the European continent from across the English Channel, would have the priority of British and American effort in men and supplies. Thus, further operations in the Mediterranean area would have to be done with forces already available there. With these restrictions Major General Mark Clark, commanding the American 5th Army, began plans for the capture of Naples as a base for future offensive operations in Italy.¹²

General Clark decided to make his landings at Salerno. That area was the farthest north he could go and still have some fighter aircraft support from the airfields in Sicily. Even at Salerno the support aircraft could stay over the beaches for only brief periods of time.¹³

The assault was begun at Salerno at 0330 hours 9 September. The German forces were prepared for the invasion and offered stiff opposition to the landing forces. In an effort to achieve surprise the 6th U.S. Corps landed the 36th U.S. Infantry Division near Paestum, about twenty miles south of the main landings. The division had no naval or air support. The 36th Division was completely inexperienced and its leading waves took heavy casualties as they waded ashore against the alert Germans. Some hours later naval gunfire support was obtained for the division and limited success was achieved against its objectives.¹⁴

¹¹Esposito (ed.), II, sec. 2, maps 89-93.

¹²Ibid., map 94.

¹³Ibid., map 95.

¹⁴Ibid.

A measure of the inexperience of the division can be obtained from a listing of the members of the Commanding General's landing party. There was neither an artillery officer nor an air support officer in the party.¹⁵ However, an occurrence on 13 September indicated the soundness of field artillery tactics and techniques of that time. In mid-afternoon a strong German counterattack suddenly developed on the left flank of the 36th Division and overran the infantry battalion there. The Germans were driving toward the American rear areas along the beaches. The 36th Division lines were broken on the left and there were considerable confusion and near-panic. The only force between the Germans and the beaches was the green artillerymen of the 36th Division Artillery. Staying with their guns, the inexperienced artillerymen, using standard artillery procedures, broke up the German attack and saved the day.¹⁶

On the other side of the world in the South and Southwest Pacific areas, 1943 saw considerably more offensive action by U.S. Army units than did 1942. However, the tactics used in those areas were quite different from those employed in the North Africa and Mediterranean areas. Early Pacific operations were characterized by dense jungles, rugged terrain, and island-hopping campaigns. As a result regimental combat teams and separate battalions were more likely to be employed as combat units than entire divisions. In general there was a greater willingness to attach artillery units to supported infantry units. At the same time there was a consistent desire evident to regain centralized control of artillery by division artillery headquarters when it

¹⁵U.S., War Department, 35th Infantry Division, "Journal" (1943), p. 11.

¹⁶Esposito (ed.), II, sec. 2, map 96.

was feasible.

Close air support problems in the Pacific area differed in some respects from those facing the infantry divisions in North Africa and the Mediterranean area. Lt. Col. Harry W. Miller, who was G-3 of the 41st Infantry Division for some thirty months as the division advanced from New Guinea to Biak Island, described some of those problems.¹⁷

Until April 1943 the 41st Division had no air support officer or party attached. As a result the air support received by the division was sketchy. The front-line units of the division often tried to mark targets for pre-planned air strikes with smoke rounds fired by mortars. These attempts were usually unsuccessful. In many cases the smoke was hidden by the jungle growth. In a few cases the Japanese fired smoke rounds into the division lines as soon as the American smoke rounds burst. This Japanese technique, of course, placed 41st Division troops in danger of air attack by friendly planes. Bomb lines were generally useless in the jungle, and the 41st Division tried to mark its front lines by reflecting sunlight from mirrors and messkits, but this method was not effective.¹⁸

In April 1943 the 41st Division received its first air support officer, but he was alone. He had no party of enlisted men and no communications. His job was to coordinate close air support for the division. By the end of June, when the division's need for air support had greatly increased, the air support officer still had no communications to work directly with the air support agencies.

¹⁷Lt. Col. Harry W. Miller, "Ground Force Tactics in New Guinea," AAFSAT Intelligence Reports, No. 35 (January, 1945), pp. 18-25.

¹⁸Ibid., pp. 19-20.

The 41st Division (-) was under the control of the 7th Australian Division. To obtain air support the 41st Division sent its requests to the 7th Australian Division, which forwarded the requests to New Guinea Force Headquarters. That headquarters passed the requests to 5th Air Force Headquarters, which passed them to the 1st Air Task Force for execution. With such a route for its requests to follow, it's surprising that the 41st Division received any air support at all. Once the division headquarters requested a mission directly from the 1st Air Task Force. The mission was quickly flown and was successful, but the division commander received an official reprimand for making the request outside proper channels.¹⁹

Later in the year the air request routing was considerably simplified. Colonel Miller praised the improved air support which the division received from both the Army Air Corps and the navy on the Hollandia operation in early 1944. By that time air support parties from both the navy and the Air Corps were attached to the division.²⁰

Artillery doctrine and techniques were also being tested by combat. In the landings on Rendova and New Georgia Islands in June and July, the 43rd Infantry Division Artillery commander retained centralized control of organic and attached artillery for most of the operation. A few attachments of artillery were made to infantry units for the landings only. The division artillery headquarters assumed control as soon as the artillery units were ready to fire. In this case the

¹⁹Ibid., pp. 20-21.

²⁰Ibid., p. 22.

terrain and scheme of maneuver permitted centralized control.²¹

In addition to his command over units of the 43rd Division Artillery, the division artillery commander exercised command and fire control over the attached antiaircraft artillery units and elements of the Marine 9th Defense Battalion (155-mm Gun). Most of the time the division artillery headquarters operated two fire direction centers. As a result, effective fire control and coordination of artillery fire depended heavily on good communications between the two fire direction centers. No difficulties were encountered in this respect. In fact, the communication facilities of division artillery appear to have been somewhat better than those of the division headquarters. Each evening the forward fire direction center would radio the coordinates of the final protective fires to corps headquarters, thus furnishing that headquarters its "...only available information as to the location of the front lines."²²

The 37th Infantry Division developed several interesting techniques to increase the effectiveness of artillery support during the Bougainville operation in the closing months of 1943. It became standing operating procedure in that division to keep a direct telephone line between the G-3 at the division CP and the division artillery fire direction center, even though the two were often separated by no more than one hundred yards.²³

²¹U.S., War Department, 43rd Infantry Division Artillery, "Quarterly Historical Report, 1 July 1943 to 30 September 1943" (5 October 1943), p. 4.

²²Ibid.

²³U.S., War Department, Army Ground Forces, "Lessons of Bougainville Campaign" (1943), part K, pp. 2-3.

The cannon companies of the division remained assigned to their parent regiments, but provisions were made for them to tie in by radio and telephone to the fire direction centers of the direct support artillery battalions supporting their respective regiments. Additional signal equipment was furnished to the cannon companies so that they could maintain these communications. The fires of the cannon companies could then be used both for on-call missions by the regimental headquarters and to augment the planned fires of the artillery battalions.²⁴

Elements of two antiaircraft artillery battalions, equipped with 37-mm and 40-mm guns, were attached to the 37th Division. Their fires were not used at all by division artillery, but were used in direct fire missions by the infantry units. The fires of the attached 90-mm gun batteries were used by division artillery to supplement the fires of the light and medium field artillery units. These fires were coordinated by the division artillery fire direction center, and were used primarily in direct fire missions. Occasionally the 90-mm guns were used on long range harassing and interdiction missions, taking advantage of their greater range capabilities.²⁵

The 37th Division also employed chemical mortars in conjunction with artillery. When elements of three chemical mortar companies (4.2-inch Mortars) of the 82d Chemical Battalion were attached to the division, procedures were established for them to receive their fire orders from artillery battalion fire direction centers. Considerable difficulty was experienced initially due to the lack of familiarity with artillery procedures by personnel of the mortar units. This problem

²⁴Ibid., part E, p. 14; part O, p. 3.

²⁵Ibid., part G, p. 1.

was reduced by training provided by division artillery officers to the chemical personnel.²⁶

This chapter has examined fire support coordination and control methods and procedures employed by infantry divisions in 1943. Bomb lines were used in the Mediterranean area primarily as troop safety measures. Due to the heavy jungles in the Pacific Theater bomb lines were useless there. For the same reason the use of artillery or mortar smoke rounds to mark air targets was impracticable in the Pacific area. Such marking was routine in the Mediterranean area. Procedures for requesting air strikes were fairly simple in the Mediterranean area. They were complicated and slow in the Pacific Theater. Division air support officers in both theaters were unable to communicate directly with the support aircraft until late in the year. When they did have direct communications, there was little effort to actually control the strike from the ground. Coordination of air support and artillery was non-existent except for marking air targets with artillery smoke rounds.

Artillery control in the Mediterranean area was usually centralized at division artillery headquarters. In the Pacific control was generally decentralized. The 37th Division, in the Pacific area, developed techniques whereby division artillery headquarters effectively controlled the fires of regimental cannon companies as well as the fires of attached 90-mm antiaircraft gun units and 4.2-inch chemical mortar units.

²⁶Ibid., part I, p. 1.

CHAPTER IV

During 1944 no formal changes were issued to War Department doctrine concerning fire support coordination. However, a number of techniques were employed by infantry divisions during the year to accomplish varying degrees of coordination. Some of these techniques were new, but most were logical extensions of existing doctrine. In this chapter the techniques used in 1944 by various divisions to coordinate artillery and air support will be examined. Where possible the results of new techniques will be evaluated.

By the beginning of 1944 some of the lessons learned in combat concerning fire support were appearing in prescribed procedures of a few divisions. Following his visit to the 1st Infantry Division, Colonel Charles H. Coates, a member of the War Department Observer Board, European Theater of Operations, submitted a copy of "an" infantry division "Standing Operating Procedures" to Headquarters, Army Ground Forces. In reality the paper he submitted was an exact copy of the 1st Infantry Division standing operating procedures (SOP) with the identifying numeral omitted.¹

In regard to close air support requests, the 1st Infantry Division SOP prescribed two procedures. The first was to be used when an air support party was with the division CP and air support control was

¹U.S., War Department, Army Ground Forces, "SOP of a U.S. Infantry Division" (7 February 1944).

elsewhere (at the corps or army CP). The second procedure was to be used when air support control was located at the division CP. In the first case subordinate units would forward air requests through command channels to the division G-3. The G-3 would immediately employ division artillery on the target if appropriate and adequate. If not, he would have the air support party request the mission from the higher air support control section. In the second case, where air support control was with the division CP, air support parties would be sent to selected subordinate units. The entire procedure for air requests would be shifted down one echelon.²

In the 1st Division the G-3 section and regimental G-3 sections were required to have at least one officer who, in addition to his other duties, would specialize in air requests and actions in connection with air-ground activities. The G-3 was given responsibility for establishing the bomb line and notifying "Air Corps" immediately of changes.³

The procedures prescribed by the 3rd Infantry Division for air support during its operations at Anzio, Italy, were somewhat different. The division did not participate in the preplanning of air strikes against targets located prior to D-day. For later call missions air support parties were assigned to the two assault regiments, the 7th and 30th, and a third air support party was located at the division CP. The regiments were to forward air requests to the division CP through their air support parties or any other communications means. The division air support officer would relay the requests directly to the air officer of 5th Army. The mission request had to contain the location of friendly troops with respect to the target as well as target information. An

²Ibid., p. 13.

³Ibid.

additional troop safety measure existed in the arrangement that if troops were attacked by friendly aircraft they would identify themselves with yellow smoke.⁴

In the 3rd Division operations at Anzio, the only preplanned coordination of artillery that was evident was that of landing units of the division artillery. The 3rd Division attached one light artillery battalion to each infantry regiment for the landing.⁵

The experiences of the 85th Infantry Division Artillery in Italy supported the soundness of artillery doctrine and techniques. The artillery concept of a free use of liaison officers among the various artillery headquarters in an area was again validated. For the 5th Army coordinated attack of 11 May 1944 the 85th Division Artillery had the 601st Field Artillery Battalion (Pack) and the 776th Tank Destroyer Battalion attached and four battalions of the 36th Infantry Division Artillery in direct support. With its total of 144 artillery pieces the division artillery fire direction center fired a forty-five minute preparation.⁶ During this period the 85th Division Artillery CP was located in an old castle at Minturno. In the same building were the headquarters of the 36th Division Artillery and the artillery liaison officers from 2d Corps Artillery, 88th Division Artillery, 3rd Division Artillery, and the 776th Tank Destroyer Battalion. Supporting fire requests were handled simply and quickly, on a "face-to-face" basis. In

⁴U.S., War Department, 3rd Infantry Division, "Field Order #1" (13 January 1944), annex 7.

⁵Ibid., pp. 1-2.

⁶U.S., War Department, 85th Infantry Division Artillery, "Operational Experiences and Policies of 85th Division Artillery: Period 10 April to 10 June 1944" (7 July 1944), p. 3.

a matter of minutes the 85th Division Artillery fire direction center could mass as many as twelve battalions of artillery on a single target.⁷

The 85th Division Artillery CP received immediate information from artillery liaison officers with the infantry on all changes in location of the leading elements of the division. Thus, it was able to continuously furnish a current no fire line to all artillery headquarters which had units firing in the area.⁸

The 88th Infantry Division Artillery, also in Italy, was aware of the value of close liaison between the division G-3 and the division artillery S-3. The division artillery commander required that his CP be located with the division CP. He required his S-3 section to be within two hundred yards of the division G-3 section, with a direct telephone line from G-3 to S-3.⁹

Efforts were also being made to improve air support in the theater. Based upon experience in North Africa and Italy, Allied Forces Headquarters in May 1944 published guidance on the use of bombers and fighter-bombers in support of ground forces.¹⁰ According to this guidance it was the duty of the ground force commander to indicate to the air commander what effect he desired and when he needed that effect to support his force. However, it was up to the air commander to select the targets and choose the method of attack.¹¹ Such a division of functions

⁷Ibid. ⁸Ibid., p. 6.

⁹U.S., War Department, 88th Infantry Division Artillery, "SOP for Field Artillery Units" (14 September 1944), p. 1.

¹⁰Headquarters Allied Forces, "Operations Memorandum No. 54: The Employment of Bombers and Fighter-Bombers in Cooperation with the Army" (6 May 1944)

¹¹Ibid., p. 1.

required very close coordination between ground and air personnel to make bombing support of ground forces effective.

The publication stated that normally the type of targets suitable for attack by bombers and fighter-bombers were not found on the battlefield. This was especially true in Italy, but occasionally the terrain of North Africa did allow fighter-bombers to attack targets in enemy forward areas. Such attacks could be made on key targets within artillery range but concealed from ground observation. However, as a rule bombers and fighter-bombers should not be employed on targets within artillery range.¹² Surprisingly, the publication made no reference to bomb lines or troop safety.

Later in the year the 36th Infantry Division landed in Southern France as part of Operation DRAGOON. The after-action report of the 36th Division Artillery made no reference to air support for that operation. In his employment of artillery, the division commander decentralized control. He attached a light artillery battalion to each regiment. The division artillery commander reported that such decentralization in no way reduced his control. When a particular regiment went into reserve the division artillery commander assigned its artillery to reinforce the light artillery battalion of another regiment.¹³

During the initial landings in Southern France, the 36th Division Artillery commander had detachments of his staff with the division commander's party and the assistant division commander's party. The pur-

¹²Ibid., p. 6.

¹³U.S., War Department, 36th Infantry Division Artillery, "Operations in France, August 1944" (10 September 1944), pp. 1-2.

pose of these detachments was to "better coordinate" the effort.¹⁴

The 29th Infantry Division also recognized the need for artillery representation at each combat echelon of the division headquarters. In early 1944 its SOP required an artillery section to be with the forward echelon of division headquarters. The artillery officer (division artillery commander) or his representative would be with the advance command group of division headquarters. The division artillery was required to locate its headquarters near that of the division.¹⁵

The 80th Infantry Division did not have an artillery representative at the forward echelon of the division headquarters as late as July 1944. This is particularly hard to understand since the air support party was required to be there. The division did require the CP's of all fire support units to be located in the vicinity of the CP's of their supported units.¹⁶ Possibly it was considered that the close proximity of the division artillery CP eliminated the need for an artillery officer at the forward echelon of division headquarters.

On 6 June 1944 Northern France was invaded by the Allies in Operation OVERLORD. The initial arrangements for air support of ground forces in that operation left much to be desired. The 1st U.S. Army air plan for the operation specified that an air support party would be with each infantry division headquarters. The party consisted of an air support officer and an unspecified number of enlisted men. The officer was to "...act in an advisory and liaison capacity with the

¹⁴Ibid., incl. 1, p. 2.

¹⁵U.S., War Department, 29th Infantry Division, "Standing Operating Procedures" (21 April 1944), p. 2.

¹⁶U.S., War Department, 80th Infantry Division, "Division Standing Operating Procedure (SOP)" (30 July 1944), p. 2.

operating staff of the division...".¹⁷ He was to report the position of front-line troops to his headquarters, but no reference was made to bomb line location.¹⁸ In spite of the lessons learned in North Africa, Sicily, and Italy, there were still no provisions for the air support officer to talk directly to the pilot of the mission aircraft.

Less than one month later several changes were made to air support procedures in Northern France. By the time of the St. Lo breakthrough the air support officers of the infantry divisions were communicating directly with the pilots of support aircraft. Their talking the pilots on to targets directly greatly improved the coordination of the attacks. It also allowed aircraft to attack targets closer to friendly troops without undue danger to our forces.¹⁹ Identification of friendly front lines became more important as targets were attacked closer to our lines. Various methods of identification were employed: cerise panels, directional lights, and colored smokes. No solution was found for identification during periods of poor visibility. As a result close air support was not utilized during those times.²⁰

Occasionally a division would utilize air support parties at regimental level. The enlisted personnel and communications equipment were from the supporting Air Corps unit. The officer of such a party was usually an Army ground officer.²¹ Using air support parties at regi-

¹⁷U.S., War Department, 1st Army, "Report of Operations: 20 October 1943 to 1 August 1944" (1944), p. 71.

¹⁸Ibid.

¹⁹U.S., War Department, Army Air Forces Evaluation Board, "Report of Tactical Committee: Study of Doctrine, Organization, Tactics and Techniques of Army Air Forces" (26 September 1944), p. 3.

²⁰Ibid.

²¹Ibid.

mental level appeared to be the exception rather than the rule. In most cases only one party was authorized to each infantry division.

Some divisions were so consistently successful in employing close air support that a feeling of mutual respect and admiration began to exist between the ground and air personnel of the division. One case was cited where a close support pilot was shot down one mile behind enemy lines. Division personnel saw him bail out, so knew he was probably still alive. The division hastily organized a coordinated air-ground attack, made a hasty penetration, and rescued the pilot.²²

Other divisions were not so fortunate in their experiences with air support. The 9th Infantry Division reported on 22 June that its division artillery had used smoke to mark strong-points and other targets for air bombardment. Friendly aircraft attacked the marked targets, then strafed the positions of five division artillery battalions, "in spite of displayed panels and orange smoke."²³ Such incidents, concluded Headquarters Army Air Forces Evaluation Board, led to "...creating a few individuals who are not in favor of this type of operation."²⁴

The procedure in use by mid-1944 in requesting air support missions was for the division to request missions directly from the army G-3 Air in the army air section. The corps air section monitored the division requests, saying nothing if it approved and cancelling the request if it disapproved.²⁵

²²Ibid., p. 4.

²³U.S., War Department, 9th Infantry Division Artillery, "Ninth Division Artillery Operations - 6 June to 2 July 1944" (4 July 1944), p. 4.

²⁴Army Air Forces, "Report of Tactical Committee," p. 4.

²⁵Ibid., p. 9.

Field artillery coordination during the early phases of the landing operations on the Normandy beaches was in accordance with the doctrine current at that time. One element of the artillery coordination, however, was important enough for 1st Army headquarters to become interested. The 4th Infantry Division and the 101st Airborne Division were to operate in the same general area initially. 1st Army directed that liaison be set up between the division artilleries of those two divisions prior to their leaving the United Kingdom. That liaison was to be maintained as long as the 101st Airborne Division was operating in front of the 4th Division. To insure that the liaison officers could continue to coordinate the fires of the two divisions, 1st Army directed that alternate means of communication would be provided them. As an added safety factor, 7th U.S. Corps was directed to prescribe a "limiting line" on a flexible time schedule to keep the two divisions from firing into each other's positions.²⁶

In an effort to utilize all artillery available during the early phases of the invasion, 1st Army directed corps and divisions to make plans to employ antiaircraft gun units as reinforcing field artillery. Such employment would be made when the guns were not required in their primary mission of air defense.²⁷

The 9th Infantry Division Artillery may well claim credit for making the first successful attempt to coordinate artillery fire with an attack by supporting aircraft. On 23 June 1944 the 9th Division Artillery smoked a series of strong-points to mark them for air bombardment. The bombing appeared to be on target. The division artillery im-

²⁶1st Army, "Report of Operations," pp. 220-221.

²⁷Ibid., p. 224.

mediately followed the bombing with a heavy artillery concentration. The total effect on the strong-points appeared to be excellent.²⁸

During July the Allied forces advanced deeper into France, and the infantry divisions saw considerable action. In general the coordination of artillery fires during this period was excellent. A considerable number of larger caliber artillery battalions (corps artilleries) had been landed. Their fires were often coordinated by division artilleries which they were reinforcing. As an example, the 30th Infantry Division was counterattacked on 9 July near St. Jean de Daye. The 30th Division Artillery directed the fires of eighteen battalions of artillery to defeat the counterattack. The firing battalions included 30th Division Artillery organic units, attached battalions, and reinforcing battalions.²⁹

The 8th Infantry Division Artillery, with the 37th Armored Field Artillery Battalion and the 537th Antiaircraft Artillery Battalion (Automatic Weapons) attached, was attached in its entirety to the 90th Infantry Division Artillery from 5 to 7 July. For those three days the 8th Division Artillery supported the attack of the 90th Division. Its fires were controlled and coordinated by the 90th Division Artillery.³⁰

Later in the month the 8th Division participated in a coordinated attack by 1st Army. For that attack the 8th Division Artillery had the 119th Antiaircraft Artillery Battalion (90-mm Gun) attached.

²⁸9th Division Artillery, "Operations - 6 June to 2 July 1944," p. 4.

²⁹U.S., War Department, 30th Infantry Division, "After Battle Report, G-3 Section: Period 1 July 1944 - 31 July 1944" (1944), p. 5.

³⁰U.S., War Department, 8th Infantry Division Artillery, "After Operation Report: Period 4 to 31 July 1944" (5 August 1944), p. 1.

The 79th Infantry Division Artillery and the 959th Field Artillery Battalion (8th Corps Artillery) reinforced the 8th Division Artillery. The 8th Division Artillery coordinated the fires of the reinforcing units as well as the fires of its own battalions throughout the attack. For the preparation phase of the attack 8th Division Artillery planned and coordinated the fires of the regimental cannon companies. For the preparation it also planned the fires of the 644th Tank Destroyer Battalion, the 709th Tank Battalion, and several chemical mortar companies, all of which were attached to the division.³¹

The attack was successful, and the 8th Division began a rapid advance. The division artillery headquarters could not control its light battalions during the advance, so one was attached to each regiment. As soon as the advance slowed, the light battalions reverted to the control of the division artillery commander.³²

The 83rd Infantry Division Artillery successfully employed 40-mm guns and .50 caliber quadruple mounts of its attached 453rd Antiaircraft Artillery Battalion to supplement the fires of its field artillery. When indirect fires were lifted for the infantry assault on La Varde Peninsula, the direct-firing antiaircraft weapons were used to force the enemy to remain under cover until the last moment. The close coordination of this support materially assisted the attacking infantry.³³

The 5th Infantry Division Artillery also gained experience in controlling the fires of other than field artillery units. When Company

³¹Ibid., p. 2.

³²Ibid.

³³U.S., War Department, 83rd Infantry Division Artillery, "Action Against Enemy Report, July 1944" (7 August 1944), p. 2.

D, 81st Chemical Battalion (4.2-inch Mortar), was attached to the division, it was further attached to the organic 19th Field Artillery Battalion. It was employed by that battalion to augment the artillery fire on targets of shorter range.³⁴ Faced with an artillery ammunition shortage, the division artillery employed the 735th Tank Battalion and the 629th Tank Destroyer Battalion (both attached to the division) in indirect firing on harassing and interdiction missions.³⁵

The 5th Division Artillery always attempted to locate its CP near that of the division.³⁶ A major purpose served by that close proximity was the immediate coordination of artillery fires with maneuver when the need arose. An unforeseen need for immediate control of artillery fires arose on 31 July when it was discovered that the division front was occupied "to a confused extent"³⁷ by personnel of the 11th British Armored Division. The division artillery commander immediately ordered that no firing would be done except on observed missions against identified enemy targets until the situation was clarified.³⁸

The coordination of artillery fires by the division artillery commander and his fire direction center posed no serious problems in any of the divisions. Field artillery doctrine appeared adequate in general. However, many techniques still needed improvement to increase the responsiveness and effectiveness of artillery control and coordination. It was mentioned earlier that some divisions routinely installed direct telephone lines between the division G-3 and the divi-

³⁴U.S., War Department, 5th Infantry Division Artillery, "After Action Against the Enemy Report: From 0001 Hrs 12 July 1944 to 2400 Hrs 31 July 1944" (3 August 1944), p. 2.

³⁵Ibid., p. 5.

³⁶Ibid., p. 4.

³⁷Ibid., p. 5.

³⁸Ibid.

sion artillery S-3. As late as September 1944 the 30th Division had not adopted that procedure.³⁹ In its attack on the Siegfried Line in October the division learned the value of that direct line.⁴⁰ Because of the close coordination required in that attack, 30th Division Artillery installed a number of direct lines from its fire direction center. One went to the corps artillery fire direction center, one went to the division G-3, and one went to the division air liaison (support) officer. In addition, direct lines were installed between the division artillery fire direction center and each of its organic battalions and attached battalions. After the attack the division artillery reported that its communications never failed in spite of severe enemy bombing and shelling.⁴¹

The S-3 of 30th Division Artillery stated that his headquarters could control up to five separate commands (battalions or groups) easily. It was difficult to control more than five. He had controlled the fires of a maximum of fourteen attached and supporting battalions in addition to his own four organic battalions. However, his control of the supporting battalions was exercised through a reinforcing division artillery headquarters and a corps artillery headquarters.⁴² In the attack of the Siegfried Line the 30th Division had two field artillery groups attached. The fire planning for the battalions of

³⁹U.S., War Department, Army Ground Forces, "Observer's Report, European Theater of Operations, 13 August - 11 October 1944" (21 October 1944), p. 6.

⁴⁰U.S., War Department, 30th Infantry Division Artillery, "After Action Report, 1 - 31 October 1944" (1944), pp. 3-4.

⁴¹Ibid.

⁴²Army Ground Forces, "Observer's Report" (21 October 1944), p. 13.

the groups was done by the two group headquarters and coordinated by 30th Division Artillery.⁴³

Most divisions habitually attached light artillery battalions to regiments during long moves and rapid advances. This attachment simplified control of the light battalions at those times. As soon as the division artillery headquarters could re-establish communications and control, it normally assumed control of the light battalions.⁴⁴

During most of August the 5th Infantry Division was deployed on a wide front. For an appreciable part of the month the light artillery battalions were attached to front-line regiments because the division artillery could not effectively control their fires. There were times when the light battalions were so located that their fires could be massed effectively with those of the remainder of the division artillery. At those times the light battalions reverted to the control of the division artillery if only for a day or so at a time.⁴⁵

Antiaircraft artillery battalions and batteries equipped with 90-mm guns were attached to infantry divisions from time to time. Several times such battalions were attached to the 30th Division. That division normally further attached the gun battalions to tank destroyer battalions already attached to the division. Their guns were employ-

⁴³U.S., War Department, 30th Infantry Division, "After Action Report, G-3 Section: Period 1 September 1944 - 30 September 1944" (1944), p. 19.

⁴⁴Army Ground Forces, "Observer's Report" (21 October 1944), p. 12.

⁴⁵U.S., War Department, 5th Infantry Division Artillery, "After Action Against the Enemy Report: From 0001 Hrs 1 August to 2400 Hrs 31 August 1944" (3 September 1944), p. 7.

ed in direct fire positions to add depth to the anti-mechanized defense of the division.⁴⁶

Although the coordination of artillery fires in 1944 was not perfect, it was generally effective in all divisions. The same statement cannot be made with regard to close air support of the divisions. The unfortunate incident of friendly aircraft attacking the 9th Division Artillery battalions on 22 June was described earlier. The 30th Division experienced a series of similar misfortunes throughout the last half of 1944.

The first episode involving damage to the 30th Division by friendly aircraft occurred on 24 July. The division had planned Operation COBRA, a division attack, for that day. Air support for the attack had been requested and approved. Prior to the scheduled time of the air attack all troops of the division had been withdrawn behind the bomb line. Their withdrawal had been covered by scheduled fires of the division artillery.⁴⁷

The air bombardment commenced at the scheduled time on 24 July, but it was delivered upon 30th Division units as well as upon the target area. From that one attack by friendly aircraft the 30th Division reported these casualties:

119th Infantry: 4 killed, 33 wounded

120th Infantry: 18 killed, 76 wounded

117th Infantry (division reserve): 8 wounded

⁴⁶U.S., War Department, 30th Infantry Division, "After Battle Report: G-3 Section: Period 1 December 1944 - 31 December 1944" (1945), p. 19.

⁴⁷30th Division, "After Battle Report: July 1944," p. 20.

743rd Tank Battalion (in assembly area): 1 wounded

823rd Tank Destroyer Battalion: bombed, no casualties

197th Field Artillery Battalion: 1 killed, 3 wounded

105th Engineer Battalions: 7 wounded

Total casualties were 23 killed and 128 wounded.⁴⁸ Operation COBRA was cancelled.⁴⁹

Later that day the 7th Corps ordered Operation COBRA to be executed the next day, 25 July. H-hour was prescribed as 1100 hours by a 7th Corps message which was distributed to all organic, attached, and supporting elements of the corps. The 30th Division insured that all its troops were well behind the bomb line. Again, in full daylight, the scheduled air attack in support of Operation COBRA bombed the 119th Infantry as well as the target area. Casualties were minor in the regiment on this second attack. Although delayed by the bombing, the 30th Division continued the attack on Operation COBRA.⁵⁰

Headquarters, 12th Army Group, investigated the episode described above. Major General Leland Hobbs, Commanding General, 30th Division, was quoted in the report. General Hobbs said that the bombers which flew parallel to the front lines dropped their bombs on the target area. Many bombers which flew across the front lines dropped their bombs short, causing the casualties to friendly troops. He stated two reasons for the bombs being dropped short. One was that the wind blew smoke and dust from the bombing toward the 30th Division lines. Successive waves of bombers seemed to use the smoke and dust as a target rather than the target area. They ignored the bomb line. The second reason, he said,

⁴⁸Ibid., pp. 18-19.

⁴⁹Ibid.

⁵⁰Ibid., p. 19.

was that other formations seemed to confuse the road which marked the bomb line with another road to the north.⁵¹

General Hobbs offered three recommendations to reduce the possibility of such accidents being repeated in the future. First, require all bombers providing support to ground forces to fly parallel to the front lines. Second, furnish ground observers to divisions, and furnish the observers with facilities for direct communication with the bombers. Third, require that bomber personnel be better trained in map reading.⁵²

A few days later, on 11 August, the 30th Division had its second unpleasant experience with friendly aircraft. The 2d Battalion, 120th Infantry, was cut off from the division near Mortain. The battalion needed supplies, particularly medical supplies. The division headquarters arranged for an air supply mission, but the lack of success was complete. "The supplies were dropped in enemy held territory...while P-47's strafed and bombed the troops for which the supplies were intended."⁵³ As an interesting aside to this incident, the artillerymen of the division learned a new way to support the infantry. Knowing the ground was fairly soft in the area of the isolated battalion, personnel of the 230th Field Artillery Battalion removed the chemical fillers from a number of smoke shells. They carefully packed medical supplies into the empty projectiles and fired them to the 2d Battalion. When the rounds were dug out of the soft earth, except for a few broken

⁵¹U.S., War Department, 12th Army Group, "Immediate Report No. 16" (6 August 1944), p. 1.

⁵²Ibid.

⁵³U.S., War Department, 30th Infantry Division, "After Battle Report, G-3 Section: Period 1 August 1944 - 31 August 1944" (1944), p. 10.

glass vials, the medical supplies were usable.⁵⁴

In spite of its troubles with air support the 30th Division continued its efforts to utilize the support of friendly aircraft. There were a number of times when the requested support was not given. For example, at 0930 hours on 10 September an air strike was requested for 1200 hours on the objective of an attack by the 120th Infantry. Difficulty in completing coordination "between air officers concerned"⁵⁵ caused the time of the approved strike to be set at 1430 hours. Since that time did not suit the attack plan of the 120th Infantry, the request was cancelled at the request of the regiment. The regiment attacked at 1200 hours without the air support.⁵⁶

On 22 September the 30th Division requested and received air missions on pillboxes in the Siegfried Line. Again the results were unfortunate. Eight of the "fire bombs" used fell in the area of the 240th Field Artillery Battalion, causing casualties and loss of considerable transport.⁵⁷ No reason was given by the division for the accident.

On 2 October the 30th Division again tried to employ air support in its attack of Siegfried Line positions. The air support was carefully coordinated with the fires of both the division and corps artilleries. The area to be attacked by air was isolated by artillery concentrations on crossroads and avenues of approach. All known enemy artillery positions within the area were fired upon by corps artillery. At the same time enemy mortar positions were fired upon by 30th Division Artillery. Immediately prior to the arrival of the supporting air-

⁵⁴Ibid.

⁵⁵30th Division, "After Action Report: September 1944," p. 6.

⁵⁶Ibid. ⁵⁷Ibid., p. 19.

craft corps artillery fires were shifted to enemy antiaircraft installations in the area. The light battalions of 30th Division Artillery began firing red smoke as previously agreed upon to mark the targets for the bombers. The front-line units of the 30th Division, by now fully aware of the dangers of friendly aircraft, carefully marked their positions with identification panels. In spite of the preparation and high degree of coordination that had gone into the plan for this air strike, the results were unsatisfactory. The bombers missed the target area by "M - I - L - E - S",⁵⁸ and some bombs fell among American units and Belgian civilians.⁵⁹ The Commanding General, 30th Division, apparently decided that he had given supporting bombers ample opportunity to help him. They had hurt him more than they had helped him. He finally refused to have any aircraft except dive bombers support his division.⁶⁰

The Commanding General, 30th Division, either changed his mind or he was overruled on the refusal to allow bombers to support his division. On three occasions in October⁶¹ and one in November⁶² the division employed bombers in conjunction with artillery fires to support attacks and help stop counterattacks. However, from 23 to 25 December the division was bombed three times by friendly aircraft near Malmedy. The

⁵⁸30th Division Artillery, "After Action Report, October 1944," pp. 3-4.

⁵⁹Ibid.

⁶⁰Army Ground Forces, "Observer's Report" (21 October 1944), p. 14.

⁶¹U.S., War Department, 30th Infantry Division, "After Battle Report, G-3 Section: Period 1 October 1944 - 31 October 1944" (1944), pp. 9, 14.

⁶²U.S., War Department, 30th Infantry Division, "After Battle Report, G-3 Section: Period 1 November 1944 - 30 November 1944" (1944), p. 4.

attacks caused "considerable loss of personnel and government property."⁶³

Other divisions also encountered difficulties in employing air support. These difficulties occurred both in obtaining air support at the time and place needed and in insuring the safety of friendly troops. No other division encountered quite as many troubles with air support as the 30th Division.

The 2d Infantry Division had a fair degree of success in its employment of air support in operations against Brest. The G-2 would periodically give a list of active and suspected targets to the air support officer and to the artillery representative. Reports of active targets were received at the division CP and the division artillery fire direction center from infantry commanders and artillery observers. The air support officer had radio communications with the pilots of support aircraft. When those aircraft were airborne, the air support officer would brief the pilots on the location of the more active targets as well as on the location of friendly front lines. Division artillery would then mark the desired target with colored smoke.⁶⁴ The 2d Division found it easier to direct fighter-bombers than heavy and medium bombers.⁶⁵ With regard to air support, the commander of the 9th Infantry Regiment (2d Division) produced what is probably the understatement of World War II. He said that a stray bomb or two and wild tracers behind front lines shake the confidence of troops.⁶⁶

⁶³30th Division, "After Battle Report: December 1944," p. 13.

⁶⁴U.S., War Department, 2d Infantry Division, "Air Support in Operations Against Brest" (18 September 1944), pp. 3-4.

⁶⁵Ibid., pp. 4-5. ⁶⁶Ibid., p. 2.

Major Daniel Webster, assistant G-3 for air, 2d Infantry Division, reported in November that the division had found air support very effective. In general, he noted, strafing had been more effective than bombing. He said that front-line infantry units were reluctant to mark their lines with the prescribed cerise panels. The Germans had used identical panels on occasion to confuse our support pilots.⁶⁷ Major J. P. Dunne, the air support officer of the 2d Division, had radio communications with the support aircraft during the latter part of 1944. He used a combination voice description and marking by artillery to identify the target for air attack. He said that his technique made ground control of air support "absolutely assured."⁶⁸

Major F. C. Landers, air support officer of the 8th Infantry Division, also had radio contact with supporting aircraft for most missions. In addition he had a direct telephone line to the division CP as well as one to the division artillery fire direction center. He could easily receive information from the G-3 on priority targets and request the division artillery to mark the targets at the appropriate time. He found that he had no control problems at all.⁶⁹

Air support was not as responsive as desired. On 27 September the 9th Infantry Division requested air strikes on a total of nine targets. Strikes on five of them were refused with no reason given to the division. Three targets were given to armed reconnaissance flights and

⁶⁷U.S., War Department, Headquarters European Theater of Operations, War Department Observers Board, "Army Ground Forces Report No. 416 - Air Support" (25 November 1944), pp. 1-2.

⁶⁸Ibid., p. 2.

⁶⁹Ibid.

the remaining one was attacked successfully with eight 500-pound bombs.⁷⁰

On several occasions during the attack on Aachen in September the 1st Infantry Division was unable to obtain the air support it requested. At other times the air support arrived too late to engage the target.⁷¹ At noon on 12 September the 18th Infantry (1st Division) reported about fifteen tanks and a large body of troops to its front. The division air support officer requested an air strike on the target. At 1332 hours, one and one-half hours later, the 18th Infantry informed the division CP that the air strike was no longer needed; the enemy had been dispersed by artillery.⁷²

Some efforts of the 1st Division to use air support were successful. On 8 October the division requested an air strike on the town of Haaren. The 33rd Field Artillery Battalion marked the target areas within the town with red smoke. After the first dive-bombing attack, the pilots could not see the target areas because of dust and smoke. The marking with red smoke was continued, and succeeding attacks were made by dive-bombers on the red smoke. The results on the target areas were reported as "excellent."⁷³ Because of its lack of responsiveness air support was not often used by the 1st Division to break up counter-

⁷⁰U.S., War Department, 9th Infantry Division Artillery, "After Action Report, 1 September to 30 September 1944" (30 September 1944), p. 8.

⁷¹U.S., War Department, 1st Infantry Division, "G-3 Report of Operations, 1 September to 30 September 1944, Inclusive" (5 October 1944), pp. 24, 27.

⁷²Ibid., p. 27.

⁷³U.S., War Department, 1st Infantry Division, "G-3 Report of Operations, 1 October to 31 October 1944, Inclusive" (5 November 1944), p. 9.

attacks. Artillery was normally employed for that purpose.⁷⁴

By the end of November 1944 considerable progress had been made in ground coordination and control of air support. At that time all the divisions of 12th Army Group had air support officers with their headquarters. All air support officers had radio communications with the support aircraft. Some of them worked at the division CP and some at the division artillery fire direction center. From time to time most of them went forward to a subordinate unit CP where they could see the target. They all had communications with the division artillery fire direction center, to more easily coordinate the artillery's marking the targets with colored smoke.⁷⁵

Within the 12th Army Group there were three types of air requests: "request missions", "planned missions", and "immediate requests."⁷⁶ The difference between the first two types of requests was in the degree of preplanning involved. A "request mission" was desired fairly quickly but not immediately. These two types of requests were submitted to the army G-3 air section through the corps G-3 air officer. The "immediate requests" were submitted by the division directly to the army G-3 air section by radio. The corps G-3 air officer could monitor the division requests and disapprove them, but such disapproval was rare. In addition to requested air support missions, the army headquarters often allotted armed reconnaissance flights to corps and divisions. The pilots of the

⁷⁴Ibid., p. 14.

⁷⁵U.S., War Department, Headquarters European Theater of Operations, "Immediate Report No. 1" (20 November 1944), p. 4.

⁷⁶Ibid.

allotted flights reported by radio to the air support officers of their respective divisions for target instructions after they were airborne. When armed reconnaissance flights were allocated to divisions, a sharp decrease in the number of "immediate requests" was noticed. From the division commander's viewpoint a pronounced increase in the effectiveness of air support resulted from the allocations.⁷⁷

Examples of marking air targets by artillery can be found as far back as 1942. By the end of 1944 such marking was the rule rather than the exception among the divisions in France and Germany. Additional techniques were employed by some divisions to improve troop safety and coordination between artillery and air support. The 104th Infantry Division Artillery near Aachen on 12 November reported plans to use artillery liaison planes to prevent air bombing accidents. The liaison planes maintained communications with artillery observers along the front lines. As the artillery planes flew along the front lines their paths served to locate friendly troops for air support pilots.⁷⁸

Division artillery fire direction centers were beginning to make definite efforts to coordinate their artillery fires with attacks by air support aircraft. There were several advantages to be gained at division level by coordinating these two types of fire support. The ordnance delivered by air had characteristics different from those possessed by artillery ammunition. Thus, a greater variety of elements within a target area could be damaged by a combined attack than could be damaged by either artillery or aircraft alone. Another advantage of combining the

⁷⁷Ibid.

⁷⁸U.S., War Department, 104th Infantry Division Artillery, "After Action Report, 1 November to 30 November 1944" (3 December 1944), p. 5.

two types of fire support was that a greater total mass of firepower would be delivered on the target within a short period of time. One disadvantage of attack by aircraft alone was that the enemy was able to accomplish some degree of reorganization between successive waves of attacking aircraft. Properly coordinated artillery fire could fill those times between waves, keeping the enemy disorganized throughout the attack.

On 19 September the 5th Division Artillery reported that a formation of thirty-five enemy tanks were quickly dispersed by massed artillery fire and fighter-bomber aircraft attacking together.⁷⁹ On 27 September the same division artillery planned heavy artillery fires to follow immediately after an attack by fighter-bombers.⁸⁰ The intention was to prolong the bombardment of the enemy. Again, on 3 October, the 5th Division broke up a counterattack by delivering heavy artillery fires on the enemy forces concurrently with strafing by supporting aircraft.⁸¹ Similar experiences were reported by the 28th Division in November⁸² and the 95th Division in December.⁸³

In addition to improving air support effectiveness and the co-

⁷⁹U.S., War Department, 5th Infantry Division Artillery, "After Action Against the Enemy Report: From 0001 Hrs 1 September to 2400 Hrs 30 September 1944" (3 October 1944), p. 5.

⁸⁰Ibid., p. 6.

⁸¹U.S., War Department, 5th Infantry Division Artillery, "After Action Against the Enemy Report: From 0001 Hrs 1 October to 2400 Hrs 22 October 1944" (24 October 1944), p. 3.

⁸²U.S., War Department, 28th Infantry Division, "After Action Report: 1 November 1944 - 30 November 1944" (5 December 1944), p. 2.

⁸³U.S., War Department, 95th Infantry Division Artillery, "After Action Report, December 1944" (2 January 1945), pp. 1-2.

ordination between air support and artillery, the divisions in Europe were acquiring a greater facility in coordinating artillery fires. During September the 1st Division Artillery employed from three to four attached artillery battalions in addition to its organic four battalions. An attached field artillery group headquarters was used to increase the span of control of the division artillery fire direction center and to plan fires for several of the attached battalions. The overall division fire plan was integrated and coordinated by the division artillery headquarters.⁸⁴

In the attack on Brest the 8th Division Artillery had attached to it the 34th Field Artillery Brigade headquarters, the 402d Field Artillery Group headquarters, and seven artillery battalions. Weapons ranged from 105-mm to 240-mm howitzers and from 4.5-inch to 8-inch guns. Five of the battalions and the group headquarters were placed under brigade control. The division artillery coordinated the fires of the brigade, the separate battalions (organic and attached), and the reinforcing fires of corps artillery battalions.⁸⁵ In September the 5th Division Artillery reported that it had coordinated the defensive fire plans of all units of the division and the fires of supporting artillery. The supporting artillery at that time consisted of the battalions of the 33rd Field Artillery Brigade and the 204th Field Artillery Group.⁸⁶

At one time or another nearly all the division artilleries in

⁸⁴1st Division, "G-3 Report, September 1944," pp. 24-52.

⁸⁵U.S., War Department, 8th Infantry Division Artillery, "After Operation Report: Period 1 to 30 September 1944" (3 October 1944), pp. 1-2.

⁸⁶5th Division Artillery, "After Action Report: September 1944," pp. 3, 6.

Europe found themselves coordinating the fires of a number of battalions besides their own. To improve coordination and reduce problems of control they employed a number of subordinate headquarters. Those headquarters were usually attached to the division artillery or were reinforcing it. They might be corps artillery brigade and group headquarters, other division artillery headquarters, or the senior headquarters of "battalion groupments" (organizations formed by grouping two or more artillery battalions under the operational control of the senior commander). Coordination was simplified by the free exchange of liaison officers.⁸⁷

In 1944 there were many opportunities for division-level coordination of fire support in Europe. There were fewer opportunities in the Pacific campaigns because of the reduced scale of the action there. The mountainous terrain and jungle areas of many of the islands forced a greater degree of decentralization than was found in European operations. Regiments, and even battalions, operated more independently than their counterparts in Europe. As a result air support of ground units evolved along slightly different lines there than it did in Europe.

Air support for most operations was furnished initially by carrier-based aircraft. The Army Air Corps began its support as soon as airfields were captured or built.

Because of the smaller-unit action one air support officer at the division headquarters was obviously not enough. Normally each regiment was assigned an air support officer. The 81st Infantry Division had an air support officer with each front-line battalion in the Palau

⁸⁷U.S., War Department, 15th Corps Artillery, "After Action Report for Month of October 1944" (5 November 1944), p. 4.

area.⁸⁸ An air liaison officer was with each regimental headquarters in the 81st Division. The battalion air support officer called his requests by radio directly to the commander of the air support unit. The regimental air liaison officer monitored the requests and disapproved them if he chose. Otherwise the commander of the air support unit passed the requests to his airborne coordinator. The coordinator would direct a particular flight or squadron on air alert to fly the mission. The 81st Division reported that it normally took from eight to fifteen minutes to complete the mission after the battalion had requested it.⁸⁹

Sufficient air support parties were assigned to the 27th Infantry Division on Saipan to permit the assignment of one party to the division headquarters and one to each regimental and battalion headquarters. The procedure for requesting air support was similar to that used by the 81st Division.⁹⁰

Apparently there were no attempts made in the Pacific area in 1944 to coordinate the use of air support with field artillery. The employment of artillery itself was considerably more decentralized than it was in Europe. The 77th Infantry Division Artillery reported that it could seldom mass the fires of all its units. Most of the missions fired were battalion and battery missions.⁹¹ The light battalions of the 96th Infantry Division Artillery were attached to regiments throughout the

⁸⁸U.S., War Department, Army Ground Forces, "Observer's Report on the 81st Infantry Division, STALEMATE Operation, 30 August - 25 September 1944" (2 October 1944), p. 4.

⁸⁹Ibid.

⁹⁰U.S., War Department, 27th Infantry Division, "G-3 Report, FORAGER Operation, 1944" (24 October 1944), p. 1.

⁹¹U.S., War Department, 77th Infantry Division Artillery, "Operation Summary: Liberation of Leyte, 23 November - 25 December 1944" (5 February 1945), sec. 3.

Leyte operation. The widely separated artillery positions and the width of the regimental fronts precluded effective centralized control by the division artillery.⁹² The 32d Infantry Division Artillery massed fires under centralized control when possible, for "best results."⁹³

During 1944 several important changes were instituted to air support procedures used in infantry divisions in Europe. The single most important change was that of the air support officer communicating directly with the pilots of the support aircraft. Army headquarters began allocating armed reconnaissance flights to corps and divisions for them to employ as the need arose. Procedures for processing division air requests were simplified. A major shortcoming still existed in the air support system: there were not enough air support officers in the divisions. Each division had one air support officer at division headquarters. In the Pacific some divisions had additional air support officers at lower levels, but the divisions in Europe did not. Air support would have been more effective had there been an air support officer at regimental and battalion headquarters.

Toward the end of 1944 there was a trend toward the integration of artillery fires with air support in a number of divisions in Europe. No such trend was evident in the Pacific area. The control and coordination of artillery fires remained centralized at the division artillery headquarters in Europe. Control of a large number of battalions

⁹²U.S., War Department, 96th Infantry Division Artillery, "Action Against Enemy Report, KING TWO Operation, Leyte, Philippine Islands" (31 December 1944), p. 13.

⁹³U.S., War Department, 32d Infantry Division Artillery, "Historical Report: K-2 Operation (LEYTE) from 14 November to 25 December 1944" (12 January 1945), p. 9.

through intermediate artillery headquarters was effective. The use of liaison officers to aid coordination was expanded. Direct communications were installed between the division G-3 and the division artillery S-3 to improve their coordination. Control of artillery in the Pacific area was largely decentralized. The improvement in coordination of artillery which was evident in the European theater was not demonstrated in the Pacific theater.

CHAPTER V

This chapter will examine the fire support coordination procedures and techniques utilized by infantry divisions during the final months of World War II. Very few new procedures were instituted in 1945. The value of those techniques which evolved during 1944 was confirmed by a large number of divisions in 1945. Areas for further improvement in fire support coordination were indicated by the experiences of a few divisions. Incidents which confirmed the value of 1944 procedures as well as episodes which indicated shortcomings in techniques will be examined.

As the war in Europe drew to a close and the German Air Force was further weakened, less Allied aircraft were required in the air-to-air fighting. Thus, more aircraft were available for the support of ground units. Further, the division capability to utilize supporting aircraft effectively had been greatly improved by the end of 1944. The improvement was due primarily to the direct radio communications between the air support aircraft and the division air support officer. The responsiveness of support aircraft to division needs was enhanced by the institution of more simplified procedures for processing air request missions. The waiting time for air support was further reduced by the allocation of armed reconnaissance flights to individual divisions and corps.

The first steps toward coordinating artillery fires with air

attacks had been taken by a few division artilleries in Europe in 1944. Such coordinated attacks were more effective on the target areas than an attack by either means of fire support alone.

In the 33rd Infantry Division coordination between artillery and air support was improved by the internal arrangement of the forward echelon CP of the division. In the G-3 tent were positions for the air support officer and the artillery officer as well as positions for the G-3 personnel.¹ The division artillery CP was immediately adjacent, with a direct telephone line to the artillery officer in the G-3 tent.²

Several division artilleries would plan artillery fire on German antiaircraft guns to coincide with air attacks on targets in the same general area. The 104th Division Artillery reported that such coordinated action by artillery was effective in silencing German anti-aircraft batteries, increasing the effectiveness of the air attacks.³ The 76th Division Artillery also fired coordinated "antiaircraft preparations"⁴ in conjunction with air attacks.

On 26 January the 928th Field Artillery Battalion (103rd Infantry Division Artillery) fired on a group of enemy vehicles near Uhrwiller. At the same time the battalion requested an air strike on the target. A flight of twelve P-47 aircraft was immediately directed to

¹U.S., War Department, 33rd Infantry Division, "Standing Operating Procedures, Division Headquarters" (18 January 1945), annex 3.

²Ibid.

³U.S., War Department, 104th Infantry Division Artillery, "After Action Report for February 1945" (9 March 1945), p. 11.

⁴U.S., War Department, 76th Infantry Division Artillery, "Report of Combat Operations, 1 - 28 February 1945" (7 March 1945), operations annex, p. 2.

the target while the battalion marked the area with red smoke. The air attack was effective. When the artillery observer saw subsequent movement in the target area and requested another air strike, some of the original aircraft returned to strafe the area.⁵

The 44th Division Artillery used red smoke to mark selected targets across the division front for air bombardment on 1 January. The airborne observers of division artillery were alerted prior to the bombing attack. They adjusted artillery fires on "German infantry flushed by the bombing, inflicting heavy casualties."⁶

The 90th Division Artillery, reinforced by several corps artillery battalions, fired a time-on-target (TOT) mission on Neider-Gondershausen. The massed artillery attack drove a large column of the enemy from the town. The division artillery S-3 requested the division G-3 to obtain high performance aircraft to bomb and strafe the retreating Germans. A squadron of support aircraft was requested by the division air support officer and it arrived in time to attack the column.⁷

The 90th Division Artillery commander and his S-3 were aware of the potential value in closer coordination of artillery and air support. In February 1945 a group of pilots from a medium bombardment group visited the division artillery headquarters. There they were oriented on the tactics and problems of ground forces and the procedures of artillery support. The purpose of the visit and orientation

⁵U.S., War Department, 103rd Infantry Division, "Operations in France, January 1945" (February 1945), p. 41.

⁶U.S., War Department, 44th Infantry Division Artillery, "Report of Action Against Enemy, January 1945" (7 February 1945), p. 2.

⁷U.S., War Department, 90th Infantry Division Artillery, "Historical Account for March 1945" (31 March 1945), p. 15.

was to increase the effectiveness of air support through a better understanding of ground forces on the part of the pilots.⁸

An airborne observer of the 89th Infantry Division Artillery directed an air strike on Stollberg by visual signals from his plane in conjunction with artillery marking the area with smoke.⁹ An airborne observer of the 5th Division Artillery located a concentration of vehicles on 18 March. The division artillery fire direction center requested an air attack on the target at the same time artillery fire began on it. The combined attack destroyed a number of the vehicles.¹⁰

A forward observer of the 109th Field Artillery Battalion (28th Division Artillery) observed an enemy column consisting of tanks, artillery, and vehicles near St. Croix, France. He was unable to adjust artillery on the column because of its range. He requested an air strike on the target through his battalion fire direction center. The support aircraft bombed and strafed the column with very good effect.¹¹

The 75th Infantry Division employed concurrent air strikes and artillery preparation fires for its attacks in the Ruhr valley. The coordination involved was done by the division artillery fire direction center. It was planned for some artillery units to fire smoke throughout

⁸U.S., War Department, 90th Infantry Division Artillery, "Historical Account for February 1945" (28 February 1945), p. 14.

⁹U.S., War Department, 89th Infantry Division Artillery, "After Action Report, 1 - 30 April 1945" (1 May 1945), p. 9.

¹⁰U.S., War Department, 5th Infantry Division Artillery, "After Action Against the Enemy Report: From 0001 Hrs 1 March to 2400 Hrs 31 March 1945" (31 March 1945), p. 8.

¹¹U.S., War Department, 28th Infantry Division Artillery, "After Action Report, 1 - 28 February 1945" (3 March 1945), p. 9.

the preparation to mark the air targets.¹² When the 1st Battalion, Infantry, was counterattacked on 7 April, a squadron of aircraft was in the division area on another mission. The air support officer immediately diverted the aircraft to the counterattacking forces. The air support delivered concurrently with the fires of four artillery battalions broke up the counterattack.¹³

Some division artilleries made no effort to coordinate their artillery fires with air support, even to the small degree demonstrated by the episodes described briefly above. Most division artilleries, however, did fire colored smoke at one time or another to mark targets for air strikes. The 80th Division Artillery reported that when it fired red smoke to mark air targets on 23 February, the Germans in the target area immediately fired red smoke into other areas. The division artillery quickly switched to another color and notified the support aircraft through the air support officer. The air strike was successful.¹⁴

Marking of targets for air strikes with colored smoke was reported by the 89th Division Artillery,¹⁵ the 104th Division Artillery,¹⁶

¹²U.S., War Department, 75th Infantry Division, "Operations in the Ruhr Valley" (n. d.), p. 13.

¹³Ibid.

¹⁴U.S., War Department, 80th Infantry Division Artillery, "After Action Report for February 1945" (1945), p. 6.

¹⁵89th Division Artillery, "After Action Report: April 1945," p. 9.

¹⁶U.S., War Department, 104th Infantry Division Artillery, "After Action Report for April" (3 May 1945), p. 10.

the 26th Division Artillery,¹⁷ the 90th Division Artillery,¹⁸ and the 35th Division Artillery.¹⁹

As pointed out at the beginning of this chapter, there were very few changes in procedures for air support in Europe during 1945. One of the few changes was one instituted by the 1st Infantry Division. When its regiments were at a "great distance"²⁰ from the division CP, the regimental commanders were given authority to request air missions directly from the army G-3 air section. This procedure was satisfactory on the few occasions it was employed, but its shortcomings were recognized. The major deficiency was the absence of communications between the regimental CP and the support aircraft.²¹

Some of the changes in procedure were instituted to improve troop safety. One change of that type was the requirement that the location of the bomb line be forwarded to reach the army G-3 air section at least four hours before it was to be effective.²² As the more easily controlled fighters and fighter-bombers became more available, fewer

¹⁷U.S., War Department, 26th Infantry Division Artillery, "After Action Against the Enemy Report: 1 February - 28 February 1945" (March 1945), p. 2.

¹⁸U.S., War Department, 90th Infantry Division Artillery, "Historical Account for April 1945" (30 April 1945), p. 11.

¹⁹U.S., War Department, 35th Infantry Division Artillery, "After Action Report No. 10, Period 0001 1 April to 2400 30 April 1945" (1 May 1945), p. 9.

²⁰U.S., War Department, 1st Infantry Division, "G-3 Report of Operations, 1 - 8 May 1945, Inclusive" (31 May 1945), p. 17.

²¹Ibid., pp. 17-19.

²²U.S., War Department, 1st Infantry Division, "G-3 Report of Operations, 1 January to 31 January 1945, Inclusive" (5 February 1945), pp. 8-9.

medium and heavy bombers were used in support of divisions. Instead they were used for deeper missions under control of the corps headquarters.²³

There were still occasional incidents in which friendly troops were attacked by Allied aircraft,²⁴ but troop safety was considerably improved over 1944. Some divisions continued to withdraw their front-line units prior to a supporting attack by bombers.²⁵

The 1st Infantry Division learned that it could bring air support in very close to its front lines if fighter-bombers were used instead of medium and heavy bombers. By March 1945 the 1st Division planned its close air support missions for fifteen to thirty minutes prior to the attack by the infantry. In the attack on one town the supporting aircraft struck their targets just three minutes before the infantry attacked. Troops of the 1st Division thought that three minutes was a little too close, but "...prisoners of war thought our infantry had landed with the bombs."²⁶

Other than the procedures employed by some divisions to accomplish a degree of coordination between artillery and air support, basic field artillery doctrine was not changed in 1945. In general, the coordination of artillery fire among a number of units was more difficult

²³U.S., War Department, 94th Infantry Division, "After Action Report, January 1945" (1 February 1945), p. 7.

²⁴35th Division Artillery, "After Action Report: April 1945," p. 10.

²⁵U.S., War Department, 9th Army, "Report After Action Against Enemy" (1945), p. 11.

²⁶U.S., War Department, 1st Infantry Division, "G-3 Report of Operations, 1 March to 31 March 1945, Inclusive" (5 April 1945), p. 43.

in 1945 than it had been in earlier years. There were several reasons for the greater difficulty. There were more divisions and corps units engaged in combat in 1945 than there had been during most of 1944. The number of longer-range artillery battalions in Europe had grown. In general, ammunition supply was greater in 1945 than it had been in 1944, permitting more firing to be done. There were more targets to fire upon as the German forces were driven back into more congested positions. The rate of advance of many divisions increased appreciably toward the end of the fighting in Europe. At that time the approaching Russian troops created safety problems for division artillery fire direction centers.

To balance the added difficulties of fire coordination, division artillery personnel had gained considerable experience during 1944. They had proven the effectiveness of artillery concepts, doctrine, and tactics. As a result only a few problems in artillery coordination arose that could not be promptly and effectively solved. Without the dependable communications of artillery units and the widespread use of artillery liaison officers many of the problems of coordination could not have been solved.

Divisions were advancing rapidly in some areas and boundaries were changing hourly at times. The rapidly changing boundaries and a high density of artillery units strained the capacity of division artilleries to furnish liaison officers every place they were needed. The 90th Division Artillery used every officer that could be spared from the headquarters as liaison officers. Even the division artillery

S-1 became a liaison officer. He was dispatched to the 4th Armored Division.²⁷

There were several occasions when artillery liaison officers were not exchanged between units. Their absence complicated artillery coordination. The 28th Division Artillery reported its difficulty in firing because the 75th Division was closing into the 28th Division sector from the north and "the French" were passing through the sector from north to south.²⁸ Combat Command "A", 5th Armored Division, moved into the 30th Division's zone without clearance from the 30th Division or 19th Corps. Unobserved artillery fires were suspended until the combat command left the zone. There were no liaison officers exchanged between the 30th Division and the 5th Armored Division.²⁹

Some problems in coordination remained in spite of the presence of liaison officers. On 18 April, near Nurnburg, units of the 42d Division were shelled by enemy artillery firing from within the no fire line of the adjacent 3rd Division. Clearance to return the enemy artillery fire had to be obtained from the 3rd Division Artillery. A liaison officer from the 3rd Division Artillery was present in the 42d Division Artillery fire direction center and clearance to fire on some targets was obtained. There was delay in obtaining clearance however, and "...many targets were lost whose reduction would have helped our infan-

²⁷90th Division Artillery, "Historical Account: March 1945," p. 31.

²⁸28th Division Artillery, "After Action Report: February 1945," p. 8.

²⁹U.S., War Department, 30th Infantry Division, "After Battle Report, G-3 Section: Period 01 April - 30 April 1945" (1945), p. 7.

try and armor."³⁰

On another occasion the 42d Division Artillery encountered problems in obtaining clearance to fire. Elements of the 12th Armored Division were operating in the 42d Division zone. Obtaining clearance to fire through the 12th Armored Division Artillery liaison officer took a lot of time. The effectiveness of the 42d Division Artillery fires was reduced. The 42d Division artillery commander instructed his observers to fire without further clearance on targets that could be absolutely identified as enemy.³¹

On 10 April the 13th Armored Division passed through the lines of the 97th Infantry Division, to cross the Sieg River and continue the attack. Units of the armored division were spread out through the 97th Division's sector for several days. The 97th Division Artillery units were restricted to firing only on definitely located and observed enemy targets during that time.³²

A number of divisions encountered problems similar to those described above. Their solutions were also similar. The 78th Division Artillery,³³ the 80th Division Artillery,³⁴ and the 83rd Division

³⁰U.S., War Department, 42d Infantry Division Artillery, "History of Operations for Month of April 1945" (May 1945), p. 6.

³¹Ibid., p. 4.

³²U.S., War Department, 97th Infantry Division Artillery, "After Action Report" (25 April 1945), p. 5.

³³U.S., War Department, 78th Infantry Division Artillery, "After Action Report Number Four" (4 April 1945), p. 3.

³⁴U.S., War Department, 80th Infantry Division Artillery, "After Action Report for March 1945" (1945), p. 6.

Artillery³⁵ employed their liaison aircraft extensively to report the locations of friendly units in zone.

The coordination of fires was not perfect. The 82d Airborne Division Artillery fired into the area of the 26th Infantry (1st Division) on 2 February. The 3rd Battalion of that regiment was "...pretty well cut up by friendly artillery fire."³⁶ Considering the rapidly changing locations of units and their shifting boundaries during those months, it is surprising that more incidents of that type did not occur. The rarity of those incidents is evidence that artillery coordination procedures were sound.

There were a few cases in 1945 when simple artillery coordination between two adjacent battalions of the same division artillery became complex. On 18 January the 2d Division planned for a battalion of its 23rd Infantry to attack north at daybreak. The adjacent battalion, of the 18th Infantry (2d Division), was to attack north at the same time and defend south "all in the same operation."³⁷ At first light, just as the attack was launched, both battalions were counterattacked by German forces from the east, south, and west. The entire episode occurred in dense woods where any degree of visual contact was practically impossible to maintain. It was difficult to accomplish any

³⁵U.S., War Department, 83rd Infantry Division Artillery, "After Action Report, April 1945" (1 May 1945), p. 4.

³⁶U.S., War Department, 1st Infantry Division, "G-3 Report of Operations, 1 February to 28 February 1945, Inclusive" (5 March 1945), p. 5.

³⁷U.S., War Department, 2d Infantry Division, "Report of Action Against Enemy" (6 February 1945), p. 4.

effective artillery coordination under those circumstances.³⁸

The 9th Division Artillery encountered similar problems in its attack near Allrode on 17 April. Elements of the division were advancing west, north, and east concurrently. Additional complications were created by elements of the 3rd Armored Division operating in the 9th Division sector. The unusual width and depth of the division sector made communications difficult and compounded the problems of artillery coordination. The 9th Division Artillery used a large number of no fire lines as its primary method of fire coordination.³⁹

During periods of rapid advance nearly all divisions attached their light artillery battalions to infantry regiments. Such attachments reduced the problems of control and coordination at division artillery headquarters. In every case, however, as soon as the division movement was slowed the light battalions reverted to the control of their division artillery headquarters. The 83rd Division Artillery usually attached the light battalions under the described circumstances. When the 92d Chemical Battalion (4.2-inch Mortar) was attached to the 83rd Division Artillery, the mortar companies were further attached to light artillery battalions which were in turn attached to infantry regiments.⁴⁰

The 90th Division Artillery reported in March that its battalions were displacing as much as three times each day to keep up with the

³⁸Ibid.

³⁹U.S., War Department, 9th Infantry Division Artillery, "After Action Report for the Month of April 1945" (30 April 1945), p. 8.

⁴⁰83rd Division Artillery, "After Action Report: April 1945," pp. 1-2.

advancing regiments. Since the division artillery headquarters could not effectively control its light battalions under those conditions, the light battalions were attached to regiments.⁴¹

In most division artilleries the organic and attached medium battalions were retained under control of division artillery. Their displacement was controlled and coordinated by the division artillery headquarters. The division artillery commander in most divisions employed his control of positioning the medium battalions to place the mass of their fires where it was most needed.

On 11 April the north flank of the 104th Division was open. The 413th Infantry was given the mission of protecting the open flank. The 104th Division Artillery commander positioned five battalions of artillery (two light battalions, two medium battalions, and one 155-mm gun battalion) in that area. Their primary mission was to support the 413th Infantry in protecting the north flank. The division artillery commander also formed an "advance" fire direction center to accompany the 413th Infantry CP. Its purpose was to control and coordinate the fires of the five artillery battalions.⁴²

The 8th Division had a partially open right flank in the Roer River area due to the disposition of 1st Division units there. Careful selection of artillery positions and timing of displacement (coordinated by division artillery headquarters) insured that one light and one medium battalion were always in rearward positions to cover that

⁴¹90th Division Artillery, "Historical Account: March 1945," pp. 3, 8.

⁴²104th Division Artillery, "After Action Report: April 1945," p. 6.

flank.⁴³

The 2d Division very seldom attached its light battalions to regiments. Those battalions remained in direct support of the regiments. The direct support artillery commander chose positions and timed the displacement of his unit to provide most effective support to the regiment. During periods of rapid advance the 2d Division Artillery commander placed organic and attached medium battalions under "operational control"⁴⁴ of the direct support artillery commanders. The "extra" artillery helped the direct support commanders maintain continuous support of the regiments while displacing their units. At the same time control of the medium battalions could quickly revert to division artillery headquarters if needed.⁴⁵

From time to time many divisions went on the defensive, even during the closing days of the war. Without exception control of artillery units in the defense was centralized at division artillery headquarters. More coordination between adjacent division artilleries in the defense was evident in 1945 than in previous years.⁴⁶

Defensive fire planning was centralized, with the division artillery fire direction center coordinating the fire plans of subordinate artillery units. The fires of reinforcing artillery units, infantry

⁴³U.S., War Department, 8th Infantry Division Artillery, "After Action Report: Period 1 February to 28 February 1945" (4 March 1945), p. 3.

⁴⁴U.S., War Department, 2d Infantry Division Artillery, "Summary of Operations, 1 March - 31 March 1945" (6 April 1945), p. 1.

⁴⁵Ibid.

⁴⁶U.S., War Department, 106th Infantry Division Artillery, "Report, After Action Against Enemy" (1945), p. 1.

cannon companies, chemical mortar units, tank units, tank destroyer units, and antiaircraft artillery units were routinely integrated into the division defensive fire plan by division artillery headquarters.

By proper planning the division artillery fire direction center was able to place the bulk of the division's defensive fires on the most dangerous avenues of approach.⁴⁷ It was necessary to coordinate defensive fires at the division artillery level to insure maximum coverage of the division front.⁴⁸

In 1945 more divisions than in previous years further attached antiaircraft artillery and chemical mortars to the division artillery headquarters.⁴⁹ The 1st Division attached chemical mortars to regiments, yet found it necessary to place their fires under artillery control to stop the mortars from firing smoke "promiscuously."⁵⁰

The employment of tank destroyer units by the division artillery on direct and indirect missions was fairly common. By March the anti-tank officer of the 78th Division was working at the division artillery fire direction center instead of at the division CP.⁵¹ The 104th Division Artillery employed the three-inch guns of the 692d Tank Destroyer Battalion very effectively to reinforce direct support battalions and

⁴⁷104th Division Artillery, "After Action Report: April 1945," p. 14.

⁴⁸83rd Division Artillery, "After Action Report: April 1945," p. 3.

⁴⁹78th Division Artillery, "After Action Report Number Four," p. 4.

⁵⁰1st Division, "G-3 Report: February 1945," p. 40.

⁵¹78th Division Artillery, "After Action Report Number Four," p. 5.

to fire harassing and interdiction missions.⁵²

By 1945 most division artilleries had a wide variety of fires available to them. The proper weapon could be utilized to engage any target. In caliber the weapons varied from 40 mm to 240 mm. The range capabilities of the weapons permitted engagement of targets all the way from the friendly front lines to the maximum range of corps artillery guns. Weapon trajectories varied from the high parabola of the 4.2-inch mortar to the extremely flat trajectory of high-velocity guns. A high degree of flexibility was inherent in artillery ammunition itself. High explosive, antitank, and white phosphorus projectiles were available as well as special purpose rounds such as smoke (white and colored), illuminating, and others. A variety of fuzes were available, so that rounds could be burst in the air, on the surface, or after the projectile had penetrated a distance into the target. Thus, the coordination of artillery fire involved considerably more than just the designation of where and when an artillery piece would be fired.

Reinforcing division artillery headquarters and attached and reinforcing field artillery group headquarters were often utilized by the division artillery commander to increase his span of control. A single artillery headquarters could seldom plan and coordinate the fires of more than six or seven subordinate units effectively. The 94th Division Artillery employed two supporting group headquarters to reduce the number of its subordinate units to six.⁵³ In an attack in February the

⁵²104th Division Artillery, "After Action Report: February 1945," pp. 3-6.

⁵³94th Division Artillery, "After Action Report: January 1945," p. 3.

9th Division Artillery fired twenty-one battalions in the preparation. The 9th Division Artillery headquarters utilized the 78th Division Artillery headquarters, the 7th Armored Division Artillery headquarters, and the 408th Field Artillery Group headquarters as subordinate planning and coordination headquarters.⁵⁴ The 5th Division Artillery employed three group headquarters to control the fires of twelve battalions of artillery.⁵⁵

In April and May it appeared that contact with the approaching Russian army was imminent. Corps and division commanders were concerned about control measures to prevent American artillery from firing on the Russians. The 76th Division Artillery had its liaison aircraft patrolling for sight of Russian units as early as 22 April.⁵⁶ On 24 April the 76th Division Artillery commander restricted artillery firing to observed missions on definitely identified targets.⁵⁷ Liaison aircraft of the 76th Division Artillery located Russian columns on 7 May and reported their locations until contact was established by ground forces.⁵⁸ In late April the 13th Corps commander ordered no artillery firing except

⁵⁴U.S., War Department, 9th Infantry Division Artillery, "After Action Report for the Month of February 1945" (28 February 1945), p. 5.

⁵⁵5th Division Artillery, "After Action Report: March 1945," p. 10.

⁵⁶U.S., War Department, 76th Infantry Division Artillery, "Report of Combat Operations, 1 - 30 April 1945" (1 May 1945), p. 2.

⁵⁷Ibid., operations annex, p. 4.

⁵⁸U.S., War Department, 76th Infantry Division Artillery, "Report of Combat Operations, 1 - 9 May 1945" (22 May 1945), intelligence summary, pp. 1-2.

observed missions on targets definitely identified as German.⁵⁹ The 8th Corps commander established a limiting line for his divisions in expectation of making contact with Russian forces. He also restricted artillery fires to observed missions on identified enemy targets.⁶⁰

Most of this chapter has been devoted to actions in Europe. This was due primarily to the fact that many more divisions and artillery battalions were engaged there than in the Pacific area. However, the scale of action in the Pacific was considerably greater in 1945 than in 1944.

Air support was employed by all the divisions in the Pacific. Other than the occasional use of artillery to mark targets for air strikes there is no indication of any effort to coordinate air strikes with artillery fires.⁶¹ On several occasions the 24th Division employed artillery, mortars, and support aircraft on the same targets with no attempt to coordinate the attacks with each other.⁶²

The 24th Division considered the close air support it received on Mindanao extremely effective. Most of its air support was provided by a Marine air group. Flights from that group were placed on air alert and would report by radio to the division air support officer when they arrived over the division area. He would turn them over to air support

⁵⁹35th Division Artillery, "After Action Report: April 1945," pp. 11-12.

⁶⁰89th Division Artillery, "After Action Report: April 1945," p. 9.

⁶¹U.S., War Department, Americal Infantry Division, "After Action Report: V-2 Operation, 26 March - 20 June 1945" (n. d.), p. 8.

⁶²U.S., War Department, 24th Infantry Division, "Mindanao: Historical Report of the 24th Infantry Division, V-5 Operation, 17 April 1945 - 30 June 1945" (1945), p. 29.

officers of the regiments which were requesting air strikes. The air support officers at the regiments would "talk" the aircraft on to their targets. The division G-2 kept a current list of secondary targets. As the flights reported to the division air support officer and if no strikes were needed at that time, the aircraft would be directed to attack targets from the G-2's list. Later in the operation the division began sending data on the secondary targets to the aircraft base ahead of time. The pilots were pre-briefed on the secondary targets and could attack them more quickly if ordered to do so.⁶³

Apparently there was no theater-wide procedure for ground control of support aircraft. The 27th Division was supported by Marine aircraft just as was the 24th Division. However, the aircraft supporting the 27th Division were controlled through their airbase. The division reported unsatisfactory results in general from its close air support. It attributed the ineffectiveness in part to the requirement of airbase control and the division's inability to control strikes from the ground.⁶⁴

The 37th Infantry Division had an air controller at each battalion headquarters by June 1945. An Army L-5 aircraft was furnished to the division air support officer so that he could control air strikes from the air. All close air support of the division was controlled by either the division air support officer or one of the battalion controllers.⁶⁵ The support pilots made frequent visits to the 37th Division's front

⁶³Ibid., annex 3, pp. 5-6.

⁶⁴U.S., War Department, 27th Infantry Division, "Operations Report: 1 January 1945 - 30 June 1945: Phase I, Nansei Shoto" (19 July 1945), pp. 103-104.

⁶⁵U.S., War Department, 37th Infantry Division, "Report After Action, Luzon, P. I., 1 November 1944 to 30 June 1945" (n. d.), p. 151.

line units to improve their understanding of the air support needs of the division.⁶⁶

The 33rd Division utilized bomb lines as safety measures. Support aircraft were encouraged to attack targets beyond the bomb line without division coordination. The division air support officer directed all strikes short of the bomb line.⁶⁷

Regimental air support officers in the 77th Division were not permitted to talk directly to the pilots of support aircraft during the operations in the Ryukyu Islands. The division artillery report stated that the effectiveness of air support would have been improved if the regimental air support officers had been allowed to guide the aircraft on close-in missions.⁶⁸

Thus, it appears that no new procedures in the division employment of air support were instituted in the Pacific area in 1945. The same general statement can be made with regard to artillery employment. Although a few divisions were occasionally able to mass the fires of several battalions, most artillery control was decentralized. The 6th Army reported that no more than five percent of artillery missions fired in the Luzon operation were controlled by the division artillery headquarters. Forty-six percent of the total missions were battery missions and twenty-five percent were single-battalion missions.⁶⁹

⁶⁶Ibid., pp. 292-293.

⁶⁷U.S., War Department, 33rd Infantry Division, "Operational Highlights of the 33rd Infantry Division" (15 May 1945), p. 21.

⁶⁸U.S., War Department, 77th Infantry Division Artillery, "Report After Action Against the Enemy - Ryukyu Islands" (30 June 1945), p. 29.

⁶⁹U.S., War Department, 6th Army, "Combat Notes No. 9" (July 1945), p. 26.

Most divisions routinely attached light artillery battalions to their regiments. The 31st Division did not. Its light battalions were normally assigned direct support missions. However, the division artillery headquarters could not exercise effective control of its battalions on some occasions. In its advance on Mindanao the 115th Infantry delayed eighteen hours waiting for its supporting artillery to be brought forward.⁷⁰

When the situation permitted the massing of division artillery fires and the addition of reinforcing corps artillery fires, the division artillery headquarters coordinated artillery support. Just as in Europe, there was a free exchange of liaison officers among artillery headquarters in the same area.⁷¹

Very few field artillery group headquarters were employed in the Pacific area. Several divisions formed battalion-groups at times to serve the same purpose.⁷² The senior headquarters in the battalion-group planned and coordinated the fires of the group. The S-3 of the 25th Division Artillery found he could control the fires of up to six battalions and three separate batteries without serious difficulty.⁷³

Most division artilleries integrated the fires of attached 4.2-inch mortar units into the artillery fire plans. At one time or another

⁷⁰U.S., War Department, 31st Infantry Division, "Historical Report: Mindanao Campaign, 22 April - 30 June 1945" (1945), p. 27.

⁷¹U.S., War Department, 32d Infantry Division Artillery, "Historical Report: M-1 (LUZON) Operation from 27 January to 30 June 1945" (16 July 1945), p. 12.

⁷²27th Division, "Operations Report: Nansei Shoto," p. 56.

⁷³U.S., War Department, 25th Infantry Division Artillery, "LUZON, P. I.: 11 January 1945 - 30 June 1945" (1945), p. 2.

practically every division in the Pacific employed 90-mm antiaircraft guns in direct fire missions.⁷⁴

It has been shown that no basic changes to artillery and air support employment and coordination were instituted in 1945. Rather trends and changes of 1944 were extended, particularly in Europe. Every infantry division had an air support officer assigned. In Europe he had radio communications with the pilots of support aircraft. In the Pacific some division air support officers had direct communications with support aircraft and others did not. Pacific divisions had additional air controllers at regimental and battalion headquarters.

The trend in 1945 was toward a greater use of fighter-bombers and fighters in air support of divisions and a reduced employment of medium and heavy bombers in that role. As a result, troop safety was improved.

No effort was made in the Pacific to coordinate artillery fires with air attacks of division targets. In Europe such coordination was made by different division artillery headquarters on a number of occasions. Invariably those coordinated attacks were more effective than attacks by either type of fire support alone. The coordination of fires among artillery units became difficult in Europe during the closing months of the war. A number of techniques were utilized by division artilleries to improve that coordination. None of the techniques were new. The two techniques that were most effective in coordinating artillery fires were the extensive use of artillery liaison officers and the utilization of attached and reinforcing artillery headquarters for planning and control of fires.

⁷⁴6th Army, "Combat Notes No. 9," p. 29.

SUMMARY

This study examined the evolution of division level fire support coordination in the United States infantry divisions during World War II. With few exceptions, concepts and doctrine for the employment of field artillery were found to be clear and well established at the outbreak of the war. In general, artillery doctrine of that time made ample provisions for the full and effective coordination of artillery fires among artillery units. In certain areas, however, that doctrine was not detailed and specific. Those areas were in the coordination of artillery support with the scheme of maneuver; in the use of liaison officers at adjacent artillery headquarters; and in the use of subordinate headquarters in planning and controlling fires. There was no doctrinal guidance for the coordination of artillery fires with air support fires.

Changes in field artillery techniques and procedures for the control and coordination of fires were few in 1942 and 1943. This was due partially to the comparatively small number of divisions actually engaged in combat during those years. Also, current doctrine was not put to the severe test to which it would be subjected a year later in France and Germany. In 1944 the large number of artillery battalions employed under division control or reinforcing the division artillery strained the control capabilities of the division artillery headquarters. The phases of rapid exploitation as well as the slower attack phases involving well-organized German counterattacks further increased the problems of control

and coordination of fires at the division artillery level.

The year of major changes in artillery techniques and procedures was 1944. The free exchange of liaison officers among artillery headquarters materially improved division artillery control capabilities. Attached and reinforcing field artillery brigade and group headquarters as well as reinforcing division artillery headquarters were employed as subordinate planning and control headquarters. As a result of these changes, division artilleries in Europe were capable of routinely coordinating the fires of up to twenty or more artillery battalions by the end of 1944. Division artillery fire direction centers were integrating the fires of a number of non-artillery weapons into the artillery fire plan as a matter of course. Also, in 1944, several division artillery fire direction centers were beginning to coordinate artillery fires with air attacks on the same target area. They found the effect of such coordinated attacks to be appreciably greater than either type of fire support alone could achieve.

Doctrine for the employment of aircraft in support of divisions was little more than general concepts at the time of the invasion of North Africa in 1942. Although each division had an air support officer assigned, he was little more than an advisor to the division commander. He had no communications with the supporting aircraft. Air support missions had to be requested hours or days in advance, and medium and heavy bombers often flew the missions. Troop safety was a major problem with that type of support.

Changes in air support procedures were gradual until 1944, the year of change for air support also. Simplified air request procedures were instituted in Europe and the Pacific to reduce the delay in

processing and filling requested missions. Except for a few divisions in the Pacific the division air support officers had radio communications with the supporting aircraft. They could direct the aircraft to the desired target, increasing the effectiveness of the support as well as reducing the danger to friendly troops.

Medium and heavy bombers had been employed very little in the ground support role in the Pacific. By the end of 1944 there was a definite trend in Europe to reduce their employment in that role. Fighter-bombers and fighters in both theaters were placed on airborne alert to respond more quickly to the immediate needs of the division.

By 1945 all the divisions in the Pacific had air support officers assigned down to regimental headquarters. Some divisions also had air support officers at their battalion headquarters. In Europe there was normally only the one air support officer in each infantry division. By the end of the war he was working very closely with the division artillery fire direction center.

Changes in techniques and procedures utilized in the air support of divisions and in the control of the fires of ground weapons originated in a number of sources. Army and Corps headquarters directed certain changes, based upon their observer reports as well as division after-action reports. Supporting Air Force headquarters instituted some changes, particularly in the procedures for processing air requests, upon the recommendations of division air support officers. Division air support officers themselves, as well as individual division artillery commanders, originated some improvements. Many of the changes and improvements were quickly instituted by other corps and divisions. The dissemination of changes to procedures and new techniques with a description of

their effectiveness was accomplished in a number of ways. Headquarters, Army Ground Forces, employed a number of qualified field-grade observers with divisions in all theaters. Their reports and evaluations of division operations and techniques were reproduced and given wide circulation by the Army Field Forces. Service schools were included in their distribution. It is safe to assume that the contents of those reports were the source of school-developed techniques, and that those techniques were at least suggested to the students at the time. Articles in military periodicals, particularly The Field Artillery Journal, provided wide dissemination of improvements in techniques and procedures.

The net result of improvements made in the control and coordination of fire support in the division during World War II indicated a trend toward centralization of that control and coordination at division level. This control was exercised at the division artillery headquarters. The trend toward coordination of air support and the fires of larger caliber non-artillery weapons with the fires of artillery units was evident by the end of the war. However, it wasn't until considerable postwar study and analysis had been accomplished that even a small degree of true integration of air and artillery support was reflected in fire support doctrine.

BIBLIOGRAPHY

Public Documents

- U.S. Department of the Army, Office of the Chief of Military History.
United States Army in World War II: Special Studies: Chronology
1941 - 1945. Washington: U.S. Government Printing Office, 1960.
- U.S. War Department. FM 6-20: Field Artillery Field Manual: Tactics and
Technique. Washington: U.S. Government Printing Office, 1940.
- _____. FM 101-5: Staff Officers' Field Manual: The Staff and Combat
Orders. Washington: U.S. Government Printing Office, 1940.
- _____. FM 101-5: Staff Officers' Field Manual: The Staff and Combat
Orders. Changes No. 2. Washington: U.S. Government Printing
Office, 1942.
- _____. Training Circular 52: Employment of Aviation in Close Support
of Ground Troops. 1941.

Books

- Esposito, Col. Vincent J. (ed.) The West Point Atlas of American Wars.
2 vols. New York: Frederick A. Praeger, 1959.

Articles and Periodicals

- Miller, Lt. Col. Harry W. "Ground Force Tactics in New Guinea," AFFSAT
Intelligence Reports, No. 35 (January, 1945), 18-25.

Unpublished Material

- Headquarters Allied Forces. "Operations Memorandum No. 54: The Employ-
ment of Bombers and Fighter-Bombers in Cooperation with the
Army." 6 May 1944.
- Great Britain, Combined Operations Headquarters. "Fire Support of Sea-
bourne Landings." 27 March 1945.

Great Britain, 21st Army Group. "Some Notes on the Use of Air Power in Support of Land Operations and Direct Air Support." December 1944.

U.S. War Department, Army Air Forces Evaluation Board. "Report of Tactical Committee: Study of Doctrine, Organization, Tactics and Techniques of Army Air Forces." 26 September 1944.

U.S. War Department, Army Ground Forces. "Report of Visit to the North Africa Theater of Operations." 11 June 1943

_____. "Lessons of Bougainville Campaign." 1943.

_____. "SOP of a U.S. Infantry Division." 7 February 1944.

_____. "Observer's Report on the 81st Infantry Division, STALEMATE Operation, 30 August - 25 September 1944." 2 October 1944.

_____. "Observer's Report, European Theater of Operations, 13 August - 11 October 1944." 21 October 1944.

U.S. War Department, Headquarters European Theater of Operations. "Immediate Report No. 1." 20 November 1944.

U.S. War Department, Headquarters European Theater of Operations, War Department Observers Board. "Army Ground Forces Report No. 416 - Air Support." 25 November 1944.

U.S. War Department 12th Army Group. "Immediate Report No. 16." 6 August 1944.

U.S. War Department, 1st Army. "Report of Operations: 20 October 1943 to 1 August 1944." 1944.

U.S. War Department, 6th Army. "Combat Notes No. 9." July 1945.

U.S. War Department, 9th Army. "Report After Action Against Enemy." 1945

U.S. War Department, 29th Tactical Air Command (Provisional). "Memorandum No. 55-1." 3 February 1945.

U.S. War Department, 15th Corps Artillery. "After Action Report for Month of October 1944." 5 November 1944.

_____. "After Action Report for Month of April 1945." 15 May 1945.

U.S. War Department, Americal Infantry Division. "After Action Report: V-2 Operation, 26 March - 20 June 1945." n. d.

U.S. War Department, 1st Infantry Division. "Field Order No. 1." 10 October 1942.

_____. "G-3 Report of Operations, 1 September to 30 September 1944, Inclusive." 5 October 1944.

U.S. War Department, 1st Infantry Division. "G-3 Report of Operations, 1 October to 31 October 1944, Inclusive." 5 November 1944.

_____. "G-3 Report of Operations, 1 November to 30 November 1944, Inclusive." 5 December 1944.

_____. "G-3 Report of Operations, 1 December to 31 December 1944, Inclusive." 5 January 1945.

_____. "G-3 Report of Operations, 1 January to 31 January 1945, Inclusive." 5 February 1945.

_____. "G-3 Report of Operations, 1 February to 28 February 1945, Inclusive." 5 March 1945.

_____. "G-3 Report of Operations, 1 March to 31 March 1945, Inclusive." 5 April 1945.

_____. "G-3 Report of Operations, 1 April to 30 April 1945, Inclusive." 30 April 1945.

_____. "G-3 Report of Operations, 1 - 8 May 1945, Inclusive." 31 May 1945.

U.S. War Department, 2d Infantry Division. "Air Support in Operations Against Brest." 18 September 1944.

_____. "Report of Action Against Enemy." 6 February 1945.

U.S. War Department, 2d Infantry Division Artillery. "Action Against the Enemy: After Action Report." 5 December 1944.

_____. "Action Against the Enemy: After Action Report." 4 January 1945.

_____. "Action Against the Enemy, After Action Report." 9 March 1945.

_____. "Summary of Operations, 1 March - 31 March 1945." 6 April 1945.

_____. "Summary of Operations, 1 April 1945 - 30 April 1945." 7 May 1945.

U.S. War Department, 3rd Infantry Division. "Field Order #1." 13 January 1944.

U.S. War Department, 5th Infantry Division Artillery. "After Action Against the Enemy Report: From 0001 Hrs 12 July 1944 to 2400 Hrs 31 July 1944." 3 August 1944.

_____. "After Action Against the Enemy Report: From 0001 Hrs 1 August to 2400 Hrs 31 August 1944." 3 September 1944.

U.S. War Department, 5th Infantry Division Artillery. "After Action Against the Enemy Report: From 0001 Hrs 1 September to 2400 Hrs 30 September 1944." 3 October 1944.

_____. "After Action Against the Enemy Report: From 0001 Hrs 1 October to 2400 Hrs 22 October 1944." 24 October 1944.

_____. "After Action Against the Enemy Report: From 0001 Hrs 31 October to 2400 Hrs 30 November 1944." 1 December 1944.

_____. "After Action Against the Enemy: From 0001 Hrs 1 January to 2400 Hrs 31 January 1945." 3 February 1945.

_____. "After Action Against the Enemy Report: From 0001 Hrs 1 March to 2400 Hrs 31 March 1945." 31 March 1945.

U.S. War Department, 6th Infantry Division. "After Action Report: Final Phase of the Luzon Campaign: 1 July to 21 August 1945." 22 August 1945.

U.S. War Department, 8th Infantry Division Artillery. "After Operation Report: Period 4 to 31 July 1944." 5 August 1944.

_____. "After Operation Report: Period 1 to 31 August 1944." 1 September 1944.

_____. "After Operation Report: Period 1 to 30 September 1944." 3 October 1944.

_____. "After Operations Report: Period 1 December to 31 December 1944." 1 January 1945.

_____. "After Operations Report: Period 1 January to 31 January 1945." 3 February 1945.

_____. "After Action Report: Period 1 February to 28 February 1945." 4 March 1945.

U.S. War Department, 9th Infantry Division Artillery. "Ninth Division Artillery Operations- 6 June to 2 July 1944." 4 July 1944.

_____. "After Action Report, 1 September to 30 September 1944." 30 September 1944.

_____. "After Action Report, 1 December to 31 December 1944." 3 January 1945.

_____. "After Action Report for Period 1st January to 31st January 1945." 14 February 1945.

_____. "After Action Report for the Month of February 1945." 28 February 1945.

- U.S. War Department, 9th Infantry Division Artillery. "After Action Report for the Month of April 1945." 30 April 1945.
- U.S. War Department, 24th Infantry Division. "Mindanao: Historical Report of the 24th Infantry Division, V-5 Operation, 17 April 1945 - 30 June 1945." 1945.
- U.S. War Department, 25th Infantry Division. "Operations of the 25th Infantry Division: LUZON, P. I., 17 January 1945 to 30 June 1945." 1945.
- U.S. War Department, 25th Infantry Division Artillery. "LUZON, P. I.: 11 January 1945 - 30 June 1945." 1945.
- U.S. War Department, 26th Infantry Division Artillery. "After Action Against the Enemy Report: 1 February - 28 February 1945." March 1945.
- U.S. War Department, 27th Infantry Division. "G-3 Report, FORAGER Operation, 1944." October 1944.
- _____. "Operation Report: 1 January 1945 - 30 June 1945: Phase I, Nansei Shoto." 19 July 1945.
- U.S. War Department, 27th Infantry Division Artillery. "Operations Report: ICEBERG Operation, Tenth Army, Okinawa Shima - Nansei Shoto, 1 January 1945 - 2 May 1945." 24 May 1945.
- U.S. War Department, 28th Infantry Division. "After Action Report: 1 November 1944 - 30 November 1944." 6 December 1944.
- U.S. War Department, 28th Infantry Division Artillery. "After Action Report, 1 - 28 February 1945." 3 March 1945.
- U.S. War Department, 29th Infantry Division. "Standing Operating Procedures." 21 April 1944.
- U.S. War Department, 30th Infantry Division. "After Battle Report, G-3 Section: Period 1 July 1944 - 31 July 1944." 1944.
- _____. "After Battle Report, G-3 Section: Period 1 August 1944 - 31 August 1944." 1944.
- _____. "After Action Report, G-3 Section: Period 1 September 1944 - 30 September 1944." 1944.
- _____. "After Battle Report, G-3 Section: Period 1 October 1944 - 31 October 1944." 1944.
- _____. "After Battle Report, G-3 Section: Period 1 November 1944 - 30 November 1944." 1944.
- _____. "After Battle Report, G-3 Section: Period 1 December 1944 - 31 December 1944." 1945.

U.S. War Department, 30th Infantry Division. "After Battle Report, G-3 Section: Period 01 March 1945 - 31 March 1945." 1945.

_____. "After Battle Report, G-3 Section: Period 01 April 1945 - 30 April 1945." 1945

U.S. War Department, 30th Infantry Division Artillery. "After Action Report, 1 - 31 October 1944." 1944.

U.S. War Department, 31st Infantry Division. "Historical Report: Mindanao Campaign, 22 April - 30 June 1945." 1945.

U.S. War Department, 32d Infantry Division Artillery. "Historical Report: K-2 Operation (LEYTE) from 14 November to 25 December 1944." 12 January 1945.

_____. "Historical Report: M-1 (LUZON) Operation from 27 January to 30 June 1945." 16 July 1945.

U.S. War Department, 33rd Infantry Division. "Standing Operating Procedures, Division Headquarters." 18 January 1945.

_____. "Operational Highlights of the 33rd Infantry Division." 15 May 1945.

U.S. War Department, 33rd Infantry Division Artillery. "Operation Report, 13 February to 20 June 1945." July 1945.

U.S. War Department, 35th Infantry Division Artillery. "After Action Report No. 7, Period 0001 1 January 1945 to 2400 31 January 1945." 1 February 1945.

_____. "After Action Report No. 10, Period 0001 1 April 1945 to 2400 30 April 1945." 1 May 1945.

U.S. War Department, 36th Infantry Division. "Journal." 1943.

U.S. War Department, 36th Infantry Division Artillery. "Operations in France, August 1944." 10 September 1944.

U.S. War Department, 37th Infantry Division. "Report After Action, Luzon, P. I., 1 November 1944 to 30 June 1945." n. d.

U.S. War Department, 38th Infantry Division Artillery. "Historical Report, M-7 Operation, 29 January 1945 to 30 June 1945." 1945

U.S. War Department, 40th Infantry Division Artillery. "Lessons Learned in Northern and Southern Philippine Campaigns." 1945.

U.S. War Department, 42d Infantry Division Artillery. "History of Operations for Month of April 1945." May 1945.

- U.S. War Department, 43rd Infantry Division Artillery. "Quarterly Historical Report, 1 July 1943 to 30 September 1943." 5 October 1943.
- U.S. War Department 44th Infantry Division Artillery. "Report of Action Against Enemy, January 1945." 7 February 1945.
- U.S. War Department, 45th Infantry Division Artillery. "History, December 1944." January 1945.
- U.S. War Department, 66th Infantry Division Artillery. "After Action Report, 1 April - 30 April 1945, Inclusive." 16 May 1945.
- U.S. War Department, 69th Infantry Division Artillery. "After Action Report for Period 1 - 28 February 1945." 2 March 1945.
- U.S. War Department, 75th Infantry Division. "Operations in the Ruhr Valley." n. d.
- _____. "After Action Report for March 1945." 4 April 1945.
- U.S. War Department, 76th Infantry Division Artillery. "Report of Combat Operations, 1 - 28 February 1945." 7 March 1945.
- _____. "Report of Combat Operations, 1 - 30 April 1945." 1 May 1945.
- _____. "Report of Combat Operations, 1 - 9 May 1945." 22 May 1945.
- U.S. War Department, 77th Infantry Division Artillery. "Report of Operations on Guam." 16 September 1944.
- _____. "Operation Summary: Liberation of Leyte, 23 November - 25 December 1944." 5 February 1945.
- _____. "Report After Action Against the Enemy - Ryukyu Islands." 30 June 1945.
- U.S. War Department, 78th Infantry Division Artillery. "After Action Report Number Two." 5 February 1945.
- _____. "After Action Report Number Four." 4 April 1945.
- U.S. War Department, 79th Infantry Division Artillery. "Operations Instructions #1." 23 March 1945.
- U.S. War Department, 80th Infantry Division. "Division Standing Operation Procedures (SOP)." 30 July 1944.
- U.S. War Department, 80th Infantry Division Artillery. "After Action Report for February 1945." a945.
- _____. "After Action Report for March 1945." 1945.

U.S. War Department, 83rd Infantry Division Artillery. "Action Against Enemy Report, July 1944." 7 August 1944.

_____. "Action Against the Enemy Report, October 1944." 1 November 1944.

_____. "After Action Report, April 1945." 1 May 1945.

U.S. War Department, 85th Infantry Division Artillery. "Operational Experiences and Policies of 85th Division Artillery: Period 10 April to 10 June 1944." 7 July 1944.

U.S. War Department, 86th Infantry Division Artillery. "After Action Report." 9 May 1945.

U.S. War Department, 88th Infantry Division Artillery. "SOP for Field Artillery Units." 14 September 1944.

U.S. War Department, 89th Infantry Division Artillery. "After Action Report, 1 - 30 April 1945." May 1945.

U.S. War Department, 90th Infantry Division Artillery. "Historical Account for December 1944." 31 December 1944.

_____. "Historical Account for February 1945." 28 February 1945.

_____. "Historical Account for March 1945." 31 March 1945.

_____. "Historical Account for April 1945." 30 April 1945.

U.S. War Department, 94th Infantry Division. "After Action Report, January 1945." 1 February 1945.

U.S. War Department, 95th Infantry Division Artillery. "After Action Report, December 1944." 2 January 1945.

_____. "After Action Report for Period 1 - 31 March 1945." 1 April 1945.

_____. "After Action Report for Period 1 - 30 April 1945." 3 May 1945.

U.S. War Department, 96th Infantry Division Artillery. "Action Against Enemy Report, KING TWO Operations, Leyte, Philippine Islands." 31 December 1944.

_____. "Action Against Enemy Report, 1 April - 30 June 1945, the Ryukyu Campaign." n. d.

U.S. War Department, 97th Infantry Division Artillery. "After Action Report." 25 April 1945.

U.S. War Department, 103rd Infantry Division. "Operations in France, November 1944." 19 December 1944.

_____. "Operations in France and Germany, December 1944." January 1945.

_____. "Operations in France, January 1945." February 1945.

_____. "Operations in Germany, April 1945." May 1945.

U.S. War Department, 104th Infantry Division Artillery. "After Action Report, 1 November to 30 November 1944." 3 December 1944.

_____. "After Action Report for January 1945." 1 February 1945.

_____. "After Action Report for February 1945." 9 March 1945.

_____. "After Action Report for March 1945." 17 April 1945.

_____. "After Action Report for April 1945." 3 May 1945.

U.S. War Department, 106th Infantry Division Artillery. "Report, After Action Against Enemy." 1945.